

**Studies in the Malesian, Australian and Pacific
Ingeae (Leguminosae-Mimosoideae) :**
**the genera *Archidendropsis*, *Wallaceodendron*,
Paraserianthes, *Pararchidendron* and *Serianthes***
(part 3)

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Summary : The first and the second instalment of the present contributions have been published in the two previous issues of this periodical (*Bulletin du Muséum, Adansonia* 5 (3) : 303-329 and 5 (4) : 335-360). This third and last instalment deals with the genera *Pararchidendron* and *Serianthes*.

Résumé : Les 1^{re} et 2^e parties de ce travail ont été publiées dans les 2 précédents fascicules de cette revue (*Bulletin du Muséum, Adansonia* 5 (3) : 303-329 et 5 (4) : 335-360). Cette 3^e et dernière partie est consacrée aux genres *Pararchidendron* et *Serianthes*.

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4. **PARARCHIDENDRON** Nielsen

Bull. Mus. natn. Hist. nat., Paris, 4^e sér., sect. B, *Adansonia*, 5 (3) : 327 (1983).
— « Gen. C » NIELSEN in *Advances in Leg. Syst.* : 186 (1981).

A new genus in *Leguminosae-Mimosoideae* — tribus *Ingeae* with affinities to the genus *Archidendron* F. v. Muell. Unarmed trees or shrubs; stipules not spinescent; leaves bipinnate, leaflets alternate; flowers collected in axillary, pedunculate corymbs; flowers uniform within the same part-inflorescence, ovary solitary; pods curved into a circle to contorted, chartaceous, flattened, dehiscent, reddish inside, the endocarp not forming envelopes around each seed, seeds ellipsoid, obovoid or subglobose, with pleurogram, without aril, with a thick, black sclerotesta, unwinged.

TYPE-SPECIES : *Pararchidendron pruinosum* (Benth.) Nielsen.

Unarmed trees or shrubs ; stipules linear to filiform, not spinescent ; leaves bipinnate, rachis and pinnae with extrafloral nectaries, leaflets alternate.

Inflorescences of axillary, pedunculate corymbs, which are often paired on short-shoots ; flowers of the same part-inflorescence uniform, bisexual, subtended by bracts, pentamerous ; calyx gamosepalous, valvate ; corolla gamopetalous, valvate ; stamens numerous, united into a tube at the base ; anthers quadrangular, minute, opening by two slits ; ovary solitary.

Pod chartaceous, flattened, curved into a circle to contorted, not segmented, reddish inside, the endocarp not forming envelopes around each seed ; dehiscent first along the ventral suture. Seeds ellipsoid, obovate or subglobose with pleurogram, without aril, with a thick sclerified exotesta ; unwinged ; endosperm absent, cotyledons large.

POLLEN : Sexine/Nexine ratio ($3/1 \mu\text{m}$) = 3. Tectal channels numerous (40-60/100 μm^2). Pore diameter $6.5 \mu\text{m}$. Specialized tectal structure, i.e. non-isometric channels (enlarged near the underlying granules) crossing \pm entirely the tectum, non radially oriented, i.e. not parallel in optical section. Nexine comparatively thin ($1 \mu\text{m}$). Var. *sumbawaensis* has areolate pollen. The other samples are fossulate. Pollen morphologically an isolated genus.

Monotypic genus distributed from Java to N.E. Australia (Queensland, North N.S. Wales). — Pl. 11.

Pararchidendron pruinosum (Benth.) Nielsen

- *Pithecellobium pruinosum* BENTH., London Journ. Bot. 3 : 211 (1844) ; Fl. Austral. 2 : 423 (1864) ; Trans. Linn. Soc., London 30 : 580 (1875) ; REICHB. f., Neuholl. Pfl. Am. Dietr. : 12 (1866) ; BAILEY, Syn. Queensl. Fl. : 146 (1883) ; Proc. Roy. Soc. Queensl. 1 : 65 (1884) ; Queensl. Woods : 51 (1888) ; *ibid.* : 60 (1899) ; Rep. Gov. Sc. Exp. Bell.-Ker : 39 (1889) ; Catal. Pl. Queensl. : 15 (1890) ; Queensl. Fl. 2 : 520 (1900) ; Compreh. Catal. : 164 (1913) ; MAIDEN, Usef. Nat. Pl. Austr. : 587 (1889) ; FRANCIS, Austral. Rainf. Trees : 161 (1951) ; PEDLEY, Austrobaileya 1 (4) : 377 (1981).
- *Albizia pruinososa* (BENTH.) F. v. MUELL., J. Bot. 10 : 9 (1872) ; Fragm. 9 : 179 (1875) ; First. Census : 47 (1882) ; Iconogr. Austr. Ac. Dec. 13 : *tab.* 2 (1888) ; Sec. Census : 81 (1889) ; MOORE, Handb. Fl. N.S. Wales : 172 (1893) ; MAIDEN, For. Fl. N.S. Wales 1 : 206, *tab.* 38 (1904).
- *Feuilleea pruinososa* (BENTH.) KUNTZE, Rev. Gen. Pl. 1 : 188 (1891).
- *Inga tenggerensis* ZOLL. & MORITZI, Natuurk. Geneesk. Arch. Neerl. Ind. 3 : 81 (1846) ; type : *Zollinger 2521*, Java (holo-, P ; iso-, A).
- *Albizia tenggerensis* (ZOLL. & MORITZI) MIQ., Fl. Ind. Bat. 1 (1) : 25 (1855) ; FOURNIER, Ann. Sci. Nat., Bot. 15 : 171 (1861).
- *Pithecellobium junghuhnianum* BENTH. in MIQ., Pl. Jungh. 1 : 269 (1852) ; Trans. Linn. Soc. London 30 : 579 (1875) ; MIQ., Fl. Ind. Bat. 1 (1) : 39, *tab.* 1 B (1855) ; KOORD. & VALETON, Meded. Pl.' tuin, Buitenz. 11 : 312 (1894) ; Koord. Exk. Fl. Java 2 : 356 (1912) ; Atlas Baumart. : *tab.* 13 (1913) ; KOORD.-SCHUM., Syst. Verz. 1 (1), Fam. 128 : 2 (1912) ; BACK., Schoolfl. Java : 349 (1911) ; Bekn. Fl. Java (ed. 5), Fam. 119 : 7 (1941) ; v. MALM, Feddes Repert. 34 : 276 (1934) ; type : *Junghuhn 79*, « Java : m. Ungarang 3-4000' » (lecto-, K).
- *Cathormion junghuhnianum* (BENTH.) HASSK., Retzia 1 : 232 (1855) ; *ibid.* (ed. 2), 1 : 272 (1858).
- *Albizia junghuhniana* (BENTH.) F. v. MUELL., J. Bot. 9 : 9 (1872).
- *Feuilleea junghuhniana* (BENTH.) KUNTZE, Rev. Gen. Pl. 1 : 188 (1891).
- *Abarema sumbawaensis* KOSTERM., Reinwardtia 6 : 160, *fig.* 45 (1962), *syn. nov.* ; type : *Kostermans 18618*, W. Sumbawa, alt. 500-600 m (holo-, BO).

- *Acacia sapindoides* A. CUNN. ex SWEET, Hort. Brit. (ed. 3) : 198 (1839), *nom. nud.*
— *Pithecellobium sapindoides* (A. CUNN. ex SWEET) DOMIN, Bibliot. Bot. 3 : 830 (1926); BACK.
& BAKH. f., Fl. Java 1 : 551 (1963), *nom. inval.*
— *Abarema sapindoides* (A. CUNN. ex SWEET) KOSTERM., Bull. Organ. Natuurw. Onderz. Indo-
nesië 20 : 38, fig. 25 (1954); Adansonia, ser. 2, 6 (3) : 358 (1966); FLOYD, N.S.W. Rainf. Trees
VIII : 14 (1979); VERDC., Man. N. G. Legum. : 219 (1979), *nom. inval.*

Shrub or erect spreading tree up to 30 m high and 0.5 m in diameter; bark grey or dark brown, inner bark reddish, sapwood straw, heartwood red-brown; branchlets terete, slightly ridged by decurrent ridges from the leaf-scars; lenticellate, puberulous to densely ferruginously tomentose, glabrescent. Stipules 1-3.5 mm long, linear to filiform, acute, puberulous to tomentose. Leaves: rachis 2-16 cm long, puberulous to densely ferruginously tomentose, sometimes glabrescent, acuminate; petiole 2-7 cm long, gland at, below or about the middle, 1.3-3.3 cm above the base, 0.8-1.5 mm in diameter, circular, flat to concave, sessile to stipitate; similar gland sometimes present at the junction of the distal pair or of pinnae; pinnae (1-) 2-3 (-4) pairs, (2.5-) 3-13.3 cm, puberulous to densely ferruginously tomentose — densely velutinous-hirsute, acuminate, glands at the junction of the 1-5 distal leaflets, 0.5-1 mm, circular, flat to concave, sessile to stipitate; leaflets 3-5 (-7) "pairs" per pinnae, petiolulate, chartaceous, drying a green colour, (1-) 2-8.4 × (0.3-) 0.7-4.2 cm, unequal-sided, asymmetrically ovate to obovate, ovate-rhomboid, elliptic, subtrapezoid to lanceolate, base asymmetrically cuneate to half cuneate half rounded; apex obtusely acuminate, rounded or acute to subcaudate; main vein central or subcentral, lateral veins numerous, prominent and reticulate.

Inflorescences: peduncles 4-9 cm long often born on short branchlets up to 4 cm long; pedicels ca. 4-5 mm long; bracts ca. 1 mm long, oblong-spathulate, concave. Calyx green, 1-1.5 (-2) mm long, cup-shaped, ± densely appressed puberulous to sericeous, teeth 0.1-0.5 mm, triangular, acute. Corolla yellowish-green, 4-5.5 (-7) mm long, subtubular, slightly widened in the distal part, appressed-puberulous to sericeous; lobes 5 (rarely 4), 0.5-1 (-2) mm, triangular-ovate, acute. Stamens white or cream turning orange after the anthesis, up to 12 mm long; tube 4-5.5 mm long, shortly united with the corolla-tube at the base, ± equalling the corolla-tube. Ovary 1-2.5 mm, glabrous, stipe 2-4 mm.

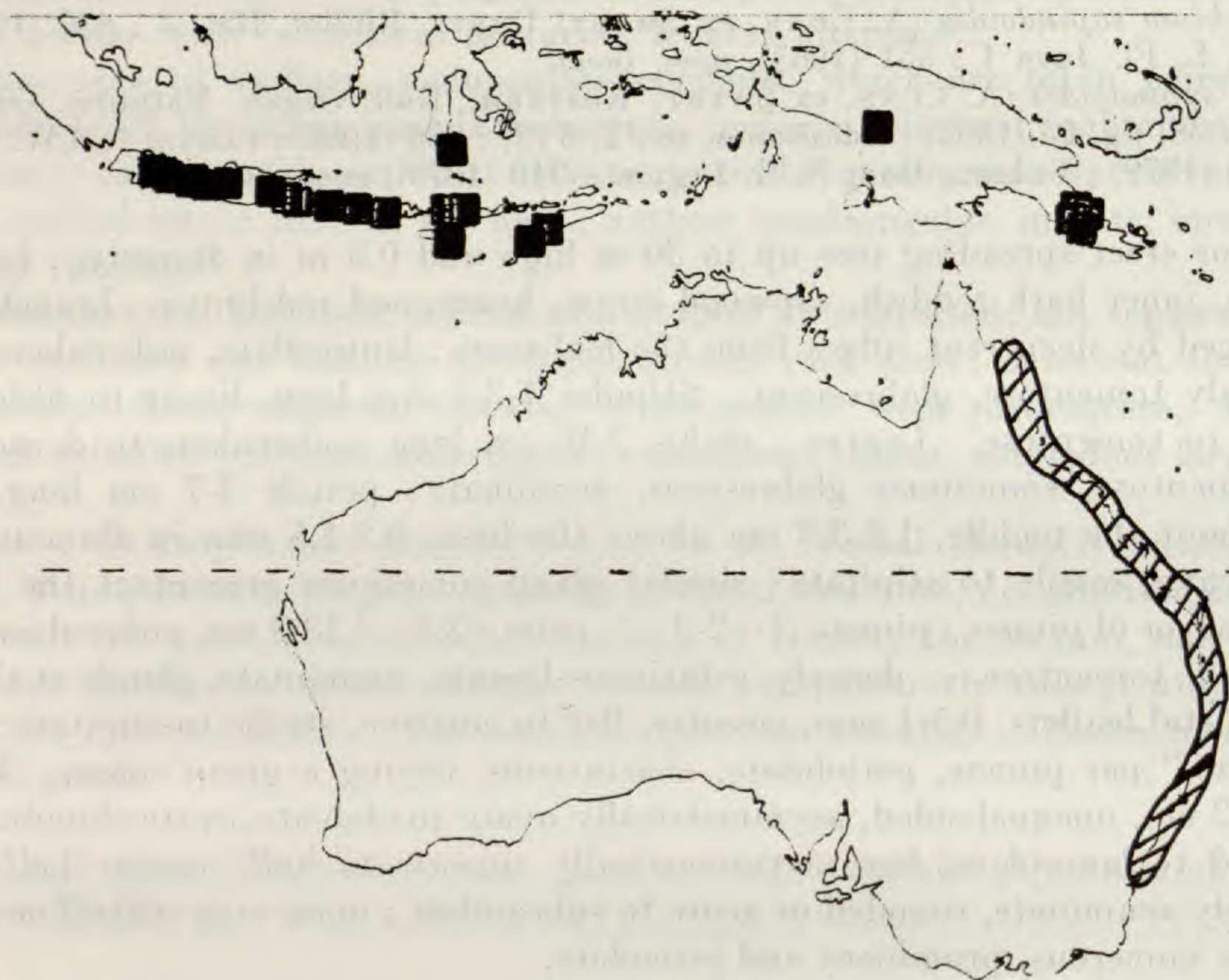
Pod yellowish to brown outside, reddish inside, 4-5 cm in diameter; valves puberulous to densely pilose, 1.1-1.7 cm broad, sinuate between the seeds, epicarp and endocarp chartaceous, bullate over the seeds. Seeds shining black, 4-8 × 4-8 × 3-4.5 mm, ellipsoid, obovate or subglobose, areole with pleurogram parallel to and ca. 1 mm from the margin, open towards the hilum; funicle thick, contorted twice.

LECTOTYPE: *A. Cunningham* $\frac{102}{1824}$, N.S. Wales, Brisbane River (K).

DISTRIBUTION: N.E. Australia (Queensland, North N.S. Wales), New Guinea, Timor, Sumba, Sumbawa, Flores, Saleir Isl., Bali, Lombok, Java.

ECOLOGY: In Australia this species is reported from the rain-forest, coastal scrub and semi-deciduous forest; alt. sea-level to 800 m; in the Malesian area it is found in montane rain-forest, both primary and secondary at altitudes from 400-2250 m.

NOTES: The specimens seem to shed their leaves once a year, judged from the herbarium material. Duration of the leafless stage is unknown to me.



Pl. 11. — Known distribution of *Pararchidendron pruinosum* (Benth.) Nielsen.

KOSTERMANS (1954 : 58) was the first to combine the Javanese and the Australian material in one species which he named *Abarema sapindoides*, *nom. inval.* as it was based on *Acacia sapindoides* A. Cunn. ex Sweet, which is a *nomen nudum* (PEDLEY, 1981). The characters used by BENTHAM to distinguish between *Pithecellobium junghuhnianum* (Java) and *Pithecellobium pruinosum* (Australia), e.g. size of corolla and indumentum-densities are overlapping (table 6). KOSTERMANS (1954) cites the type of *P. junghuhnianum* Benth. as "Junghuhn s.n. (BO)". This specimen has no locality written on the label and was not annotated by BENTHAM. *Junghuhn 79* (K), which is annotated by BENTHAM has "Java : m. Ungarang 3-4000'" written on the label, the locality which is mentioned in the protologue and is accordingly selected as type.

TABLE 6 : Variation in *P. pruinosum*

CHARACTER	ORIGIN	Java	Sumbawa	New Guinea	Australia
Calyx length, mm		1-1.5	1.5-2	1.2-1.5	1-1.5
Corolla length, mm		5.5-6.5	6-7	5.2-5.5	4-6
Indumentum of young parts		densely rusty tomentose	densely velutinous to hirsute	subglab.	subglab. to shortly tomentose

Both KOSTERMANS and VERDCOURT (1979 : 219) state that the corolla-tube is 10 mm long.

Indumentum and leaflet characters are that variable that it seems better not to apply specific rank to the different entities. The Javanese material has a very dense, rusty brown indumentum in the younger parts. Material from Sumbawa, described by KOSTERMANS (1962 : 161) as *Abarema sumbawaensis* has densely velutinous to hirsute branchlets, but has similar flowers and pods. Material from Flores (*Kostermans & Wirawan 675*) has a similar but not quite as dense indumentum. The New Guinea material tends to be subglabrous. Australian specimens are subglabrous to shortly tomentose. It seems at present best to deal with the following varieties.

KEY TO THE VARIETIES

1. Petiolar gland sessile ; apex of leaflets rounded, acuminate, obtuse.
 2. Indumentum of inflorescence, young branches and leaf-rachis subglabrous to densely tomentose.
 3. Indumentum of young parts of plants subglabrous to shortly tomentose..... a. var. *pruinorum*
 - 3'. Indumentum of young parts of plants densely rusty tomentose. b. var. *junghuhnianum*
 - 2'. Indumentum of inflorescence, young branches and leaf-rachis densely velutinous to hirsute. c. var. *sumbawaense*
 - 1'. Petiolar gland sessile to substipitate to stipitate ; apex of leaflets acute, subcaudate or acuminate-mucronulate d. var. *novo-guineense*

a. var. **pruinorum**

Indumentum of inflorescence, young branches and leaf-rachis subglabrous to shortly tomentose ; petiolar glands sessile ; leaflets puberulous to subglabrous, apex rounded to acuminate, obtuse.

DISTRIBUTION : Australia (0-800 m).

b. var. **junghuhnianum** (Benth.) Nielsen

Bull. Mus. natn. Hist. nat., Paris, 4^e sér., sect. B, Adansonia, 5 (3) : 328 (1983).

— *Pithecellobium junghuhnianum* BENTH. in MIQ., Pl. Jungh. 1 : 269 (1852).

Indumentum of inflorescence, young branches and leaf-rachis densely rusty tomentose ; petiolar gland sessile ; leaflets puberulous to subglabrous, apex rounded to acuminate, obtuse.

LECTOTYPE : *Junghuhn 79*, « Java : m. Ungarang 3-4000' » (K).

DISTRIBUTION : Java (1000-1700 m) ; Bali (\pm 1000 m) ; Lombok (1400 m) ; Sumba (700 m) ; Saleir Islands (\pm 400 m) ; Timor (\pm 500 m-1400 m).

c. var. **sumbawaense** (Kosterm.) Nielsen

Bull. Mus. natn. Hist. nat., Paris, 4^e sér., sect. B, Adansonia, 5 (3) : 328 (1983).

— *Abarema sumbawaensis* KOSTERM., Reinwardtia 6 : 160, fig. 45 (1962).

Indumentum of inflorescence, young branches and leaf-rachis densely velutinous to hirsute ; petiolar glands sessile ; leaflets densely velutinous to hirsute ; apex rounded to acuminate, obtuse.

TYPE : *Kostermans 18618*, W. Sumbawa (holo-, BO ; iso-, AAU, A, BH, BISH, BM, BZF, CANB, L, LAE, LE, K, P, PNH, SING, US).

VERNAC. : « rêkèt » (Flores).

DISTRIBUTION : Sumbawa, W. Flores ; alt. 500-1500 m.

MATERIAL STUDIED : *Kostermans 18618, 18621*, Sumbawa.

NOTE : *Kostermans 675*, W. Flores, probably belongs here, but has less dense indumentum. *E. Schmutz 3366*, Nunang, Flores, alt. 700 m, 6.9.1973 (ster.) and *2773*, Flores, W. Manggarai, Sesok, alt. 1000 m, 4.11.1971 (fr.), belong here.

d. var. **novo-guineense** Nielsen

Bull. Mus. natn. Hist. nat., Paris, 4^e sér., sect. B, Adansonia, 5 (3) : 328 (1983).

Differs from var. *pruinatum* in having acute leaflets.

TYPUS : *Mary S. Clemens 11334*, New Guinea, Matap, Morobe distr. ; alt. 1650-2000 m (holo-, A).

Indumentum of inflorescence, young branches and leaf-rachis \pm densely puberulous ; petiolar glands stipitate to sessile ; leaflets glabrous except for the scatteredly pilose main vein, apex strongly acuminate-subcaudate, acute or if obtuse then mucronulate.

DISTRIBUTION : New Guinea, alt. ca. 1300-2250 m.

5. **SERIANTHES** Benth

London J. Bot. 3 : 225 (1844) ; *ibid.* 5 : 108 (1846) ; Trans. Linn. Soc. London 30 : 600 (1875) ; GUILLAUMIN, Notul. Syst. (Paris) 2 : 374 (1913) ; Bull. Soc. Bot. France 83 : 315 (1936) ; Fl. Anal. Nouv. Caled. : 159 (1948) ; Fosb., Reinswardtia 5 : 293 (1960) ; MOHL., *ibid.* 6 : 440 (1963) ; HUTCH., Gen. Fl. Pl. 1 : 294 (1964) ; VERDC., Man. N. G. Legum. : 196 (1979) ; KANIS, Brunonia 2 : 289 (1980) ; NIELSEN in POLHILL & RAVEN, eds., Advances in Leg. Syst. : 186 (1981) ; Fl. de la Nouvelle-Calédonie et dépendances 12 : 47 (1983).

Unarmed trees or shrubs ; stipules linear to filiform, only observable in the seedling stage ; leaves bipinnate, rachis and pinnae usually with extrafloral nectaries ; leaflets alternate, sessile. Inflorescences of pedunculate spikes, racemes or 1-4-flowered glomerules of usually pedicellate flowers subtended by large concave, caducous, tomentose bracts ; peduncles collected in racemes or panicles ; flowers uniform, bisexual, pentamerous ; calyx gamosepalous, valvate, usually circumscissile at the base ; corolla gamopetalous, valvate, tube united with the staminal tube in the lower part ; stamens numerous, united into a tube at the base ; anthers quadrangular, minute, opening by two slits with 4 16-celled polyads of pollen in each locus ; ovary sessile, 1 (-2).

Pods woody, straight to curved, flat, indehiscent to very tardily dehiscent (rarely), usually discontinuous within, the transverse seeds being isolated in a chamber each; valves brownish to blackish outside, not reddish inside, the endocarp not forming envelopes around each seed. Seeds usually elliptic to oblong, flattened with a hard, black testa with pleurogram, without wing; aril absent; endosperm absent, cotyledons large, radicle curved.

TYPE : *Serianthes grandiflora* Benth (see p. 94).

MORPHOLOGY

SEEDLINGS : Only observed in three species, *S. calycina*, *S. magaretae* and *S. sachetae*. The germination is epigeaeous, cotyledons green and early caducous; the two first foliar leaves opposite, bipinnate with two pairs of pinnae with opposite leaflets; the next two leaves are alternate with 1 pair of pinnae only; the following leaves are alternate with an increasing number of pinnae and the leaflets becoming alternate after leaf no. ca. 10.

LEAVES : One of the characters used by FOSBERG (1960 : 299) : "Midvein of leaflets appearing to be diagonal across at least middle third of leaflet rather than parallel with the margins" is difficult to apply on specimens with narrow leaflets. The largest leaflets from the central part of the pinnae should always be examined at identification. As leaves on saplings tend to be larger and with more numerous pinnae and leaflets the leaves of the fertile branches should be used for identification.

INFLORESCENCES : The basic unit of the inflorescence is either a pedunculate spike (in subg. *Minahassae*) a pedunculate raceme or glomerule (in subg. *Serianthes*). This basic unit is collected in either umbels, racemes or panicles. As indicated in the introduction the elongated type of inflorescence-unit (e.g. the spike and the raceme) is to be considered less advanced. This is the reason why the sections possessing these have been placed first.

FLOWERS : The dimensions of the calyx and the corolla given here are often smaller than the ones given by FOSBERG (*l.c.*). The reason for that is that the length of the nearly ever present pedicel has not been included in the length of the calyx and the corolla. The borderline between calyx and pedicel is where the calyx is circumscissile. The pedicel can also be observed as the narrowed, lower part of the calyx if this is not yet circumscissile. After the anthesis the calyx gets shorter and narrower in many species. Consequently the figures given apply to the young flowers only. The colour of the stamens is useful when defining supraspecific categories the stamens being white or creamish all over in subg. *Minahassae* and sect. *Serianthes*, reddish or purple in the distal part in the species of sect. *Calycina*.

Pods : The morphology of pods is useful for defining the sections in *Serianthes*. The wall of the pod is divided into two more or less distinct layers the epicarp and the endocarp (terms used in the present paper as no developmental studies have been made and the

terms exo- meso- and endocarp thus could not be applied). In subg. *Minahassae* the epicarp is thinly woody, the endocarp is parchmentlike, separating from the epicarp. In sect. *Seriantes* the epicarp is thin and flaking, the endocarp is woody, not separating from the epicarp. In sect. *Calycina* the epicarp is coriaceous, rigidly chartaceous to woody, the endocarp is \pm parchmentlike, only observed separating from the epicarp in one species, *S. sp.* in obs. (= *S. melanesica* Fosb. var. *samoensis* Fosb.). In some cases the morphology of the pods can be used in distinguishing between species (e.g. the raised and forked veins of the pods of *S. hooglandii*). However, the size of the pods and the number of seeds also seem to depend on the edaphic conditions. Fully ripe pods are needed, too. Margins which seem to be thick, veins that are prominent in young pods may be inconspicuous and invisible in the mature ones (e.g. *S. sachetae*). The seeds are placed in one-seeded separate chambers formed by the endocarp. Generally spoken the woody and heavy pods found in subg. *Serianthes* are clearly discontinuous within, whereas the thinner pods of *S. minahassae* are nearly continuous.

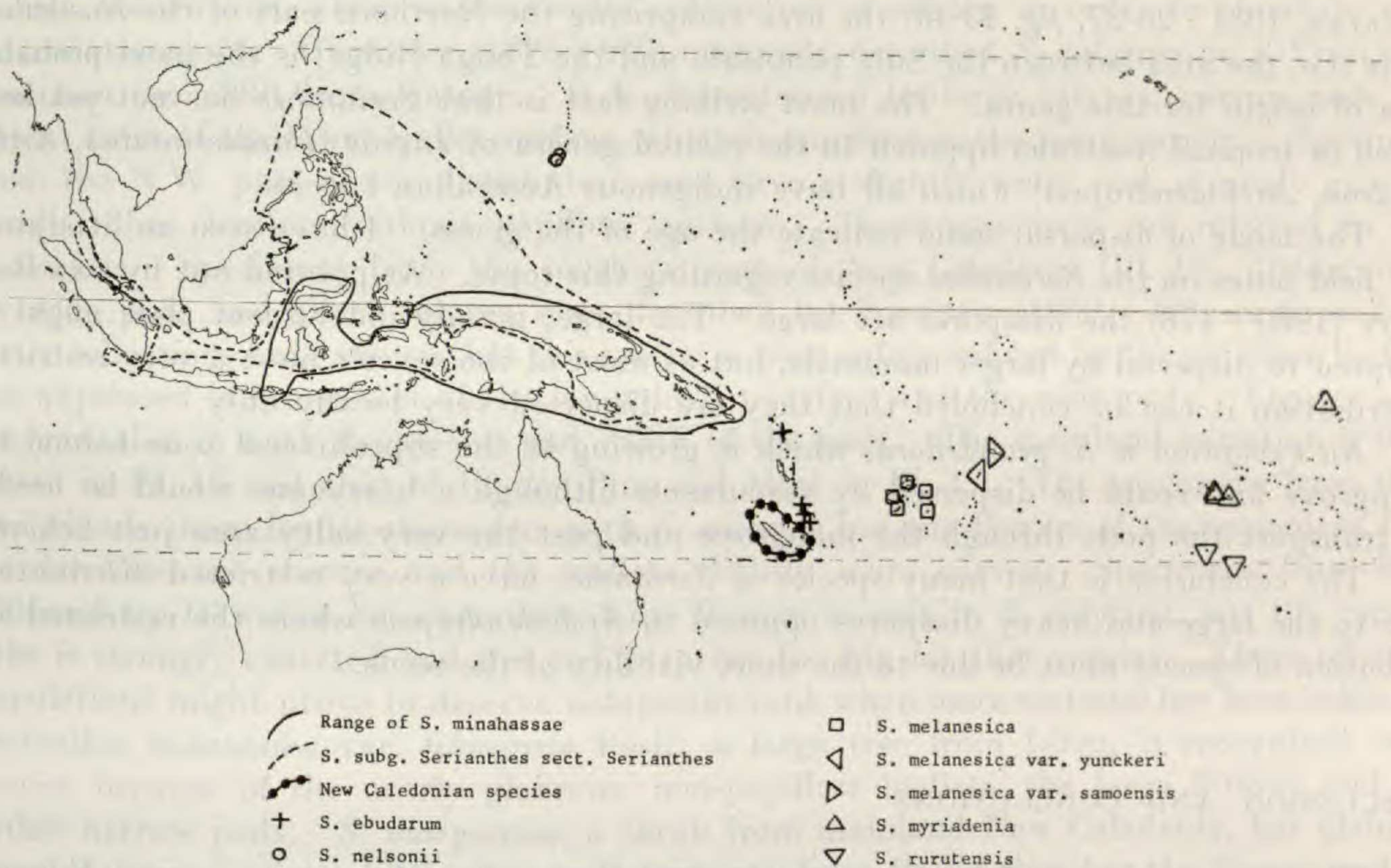
SEEDS : Testa a very hard sclerotesta. It is necessary to scarify the seeds in order to obtain quick germination under artificial conditions. The pleurogram is normally open, rarely closed (*S. ebudarum*). Seeds were studied in most of the species but only from 1 or a few specimens of each. With the variation seen in species as *S. sachetae* and *S. calycina* in mind, the shape and the size of the seeds are only partly useful as key-characters.

POLLEN : Sexine/Nexine ratio : 3-5. Numerous tectal channels (40-60/100 μm^2) in most species. Pore diameter : 7-10 μm . Sexine thick (3-7 μm). Surface with polygonal areoles. Infrageneric variation : *S. minahassae* the only species with a generalized tectal structure (isometric channels). Moreover the nexine of this species is of the same thickness in all cells. Few channels in central cells (30-40/100 μm^2) occur in *S. minahassae* subsp. *ledermannii* and *S. kanehirae* (var. *yapensis*).

Pollenmorphologically a highly differentiated genus. The pollen characters of *S. minahassae* suggest affinities with *Archidendropsis* subg. *Archidendropsis* (particularly *A. granulosa*, *A. glandulosa*, *A. cf. sepikensis*, *A. fournieri*) which has a similar nexine thickness. One character of *S. minahassae* : tectal channels comparatively few in number is common with *Albizia* and *Paraserianthes*.

GEOGRAPHY

VAN BALGOOY (1969 : 65, 178) listed *Serianthes* under distribution type 5a, Malesian genera which included all genera centering in Malesia and not or sparingly represented in neither Asia or Australia (Malesia sensu v. BALGOOY includes The Solomons, W. Carolines, New Hebrides and Rapa all belonging to the East Malesian Province). FOSBERG (1960 : 296) found that the main centre of diversity seemed to be Melanesia especially New Caledonia. KANIS (1980 : 293) concluded that the genus *Serianthes* represents a Pacific element in the Malesian flora (Malesia sensu KANIS is the area covered by Flora Malesiana) as the only two species occurring west of the Papuan subregion, *S. minahassae* just reaches Wallace's Line and only *S. grandiflora* which is supralittoral has crossed it successfully



Pl. 12. — Known distribution of **Serianthes** Benth.

occurring in the Philippines as well as on islands on the Sunda Shelf. KANIS (1980 : 294, 295 fig. 1 & 2) mapped the distributions of *S. minahassae*, *S. nelsonii*, *S. dilmyi*, *S. robinsonii*, *S. hooglandii*, and *S. kanehirae*. The distributional area of the remaining species have been mapped below or is mentioned under each species.

Subg. *Minahassae* is found from Celebes throughout to the Solomon Islands. Sect. *Serianthes* has a Malesian main distribution but is also found in the Southern part of the Caroline Islands, Solomon Islands and perhaps the New Hebrides and Fiji (*Serianthes* sp. in obs. and *S. vitiensis*). Sect. *Calycina* is purely Pacific.

These data show that *Serianthes* is a E. Malesian genus. The New Caledonian species all belong to the Pacific section *Calycina* and are closely related both regarding inflorescence-structure, the pollen and the texture of the pod. The present results thus confirm those of VAN BALGOOY (*l.c.*).

The high proportion of narrow endemics is evident (Pl. 12). In areas with a wide range of habitats secondary centres of evolution are found (New Caledonia and to a lesser degree Fiji Islands) the main factors of evolution presumeably being isolation and genetic drift (see also FOSBERG, 1960 : 298). v. BALGOOY (1971 : 135) discussed the historical geographic implications of the plantgeography of the Pacific mentioning the classical topics of discussion e.g. whether the islands of the Pacific are geologically young (= the flora is recent and dispersal at random overseas) or the islands are old representing remnants of old foundered continents (= the flora is a "relictual one that has originated by slow overland dispersal"). As pointed out by FOSBERG (1960 : 298) the same pattern of speciation will be the result. With the past continental movements in mind (cf. AUDLEY-

CHARLES, 1981 : 26-27, fig. 43-46) the area comprising the Northern part of the Australian Plate (i.e. the area between the Sula peninsula and the Tonga Ridge) is the most probably area of origin for this genus. The most striking fact is that *Serianthes* has not yet been found in tropical Australia opposed to the related genera of *Ingeae* (*Paraserianthes*, *Archidendron*, *Archidendropsis*) which all have indigenous Australian species.

The mode of dispersal could indicate the age of the genus. I have seen no literature nor field notes on the *Serianthes* species regarding this topic. As pointed out by VAN BALGOOY (1969 : 178) the diaspores are large. The large, mainly indehiscent pods might be adapted to dispersal by larger mammals, but as most of the species have a very restricted distribution it can be concluded that they are dispersed very locally only.

An exception is *S. grandiflora*, which is growing in the supralittoral zone behind the mangrove and could be dispersed by seacurrents although a hurricane would be needed to transport the pods through the mangrove and past the very salty area just behind.

The conclusion is that many species of *Serianthes* have a very restricted distribution, due to the large and heavy diaspores opposed to *Archidendropsis* where the restricted distribution of species must be due to the short viability of the seeds.

DISCUSSION AND CONCLUSIONS

The genus was revised by FOSBERG, *l.c.* and KANIS, *l.c.* (Malesian species). FOSBERG recognized 13 species which were based mainly on the size of leaflets, the position of the main vein of the leaflets, the size and the form of the calyx and the width and morphology of the pod. During the twenty years since FOSBERG's revision appeared much additional material has been collected in New Caledonia and New Guinea, whereas little additional material has been collected from the other parts of the area of distribution. KANIS' paper deals with the 4 species, which have their main distribution in Malesia. As I agree in the taxonomic concepts of KANIS for these species, they are just mentioned in the key and enumerated with a reference to KANIS' work and a few supplementary notes. Descriptions of the remaining part of the species have been included. The reasons for that is partly additional material, partly differences in taxonomic concepts between FOSBERG and I, differences which have been pointed out in the chapter on morphology. KANIS (1980 : 290) pointed out that : "characters like the texture of the legumes and the leaf vestiture do change too much with age to be usefull for identification purposes." Flowering specimens usually have young leaves just below the inflorescence. If the pods are ripe e.g. with ripe seeds the structure of the wall is characteristic for catagories above the level of species. The characters of the leaflet-indumentum are useless in some instances (*S. ebudarum*, *S. melanesica*) where they are not linked with other characters. They are usefull in other instances (the New Caledonian species) where they are linked with other leaf-characters, characters of flowers and of pods.

The genus shows the most intricate pattern of variation in New Caledonia, where 6 species, all belonging to Sect. *Calycina* are recognized. *S. petitiana* (Pl. 13), *S. germainii* (Pl. 19) are distinct. The former because of the numerous pinnae, with numerous, small leaflets. The latter because of the glabrous leaflets, the small flowers and pods with large, strongly flattened seeds. The remaining 4 species form a complex, which is not yet suffi-

ciently known and where experimental cultivation is needed in order to elucidate their interrelationships. BENTHAM (1875 : 600) originally described *S. calycina* on a VIEILLARD specimen (no. 419) from Gatope. It is characterized by large calyces, narrow pods and patent hairs of the lower leaflet-surface, which is papillose in the main variety. Specimens from the N.W. part of the distribution area have a slightly wider pod, strongly exerted corolla-tubes, leaflets without papillose epiderm. These specimens are referred to var. *kaalaensis*. Specimens from the southern part of New Caledonia (Pl. 16), distinguished by wide pods and short calyces were described by FOSBERG (1960 : 300) as *S. sachetae*. Later collections have shown that this species is most safely defined by the papillose leaflets, the adpressed indumentum of the lower leaflet-surface and the wide pods. Figures show the variation in both flower-size and width of the pods. The mainland variation is illustrated in Pl. 16 and that of Ile des Pins and Maré in Pl. 17. The specimens from these two islands share leaflet-characters with *S. sachetae* but the flowers of the specimens from Ile des Pins are shorter and the leaflets slightly more curved. Specimens from Maré collected by DÄNIKER has extremely large flowers as seen in *S. calycina*, but the corolla-tube is strongly exerted and the pod is rather too big for that species. These off-shore populations might prove to deserve subspecific rank when more material has been collected. *Serianthes melanesica* var. *lifouensis* Fosb., a large tree from Lifou, is recognized as a species because of the nearly glabrous, non-papillose leaflets, the large flowers and the rather narrow pods. *S. margaretae*, a shrub from mainland New Caledonia, has glabrous to subglabrous leaflets. It is close to *S. germainii* from Ile des Pins but the flowers and the pods are larger and the seeds are more narrowly elliptic. For further notes on the variation of the New Caledonian and other species please see the notes under the species.

KEY TO THE SUBGENERA, SECTIONS, SPECIES, SUBSPECIES & VARIETIES

1. Inflorescence of racemosely arranged pedunculate spikes. (subg. *Minahassae* Nielsen)..... *S. minahassae*
 - 1a. Pod 2.7-4 (-4.5) cm wide.
 - 1b. Petiolar gland not concave in the central part ; leaflets (2-) 2.5-4 mm wide ; pods dehiscent..... 1a. subsp. *minahassae*
 - 1b'. Petiolar gland concave in the central part ; often rimmed ; leaflets 1.5-2.5 mm wide ; pods indehiscent..... 1b. subsp. *ledermannii*
 - 1a'. Pod (4.5-) 5-7 cm wide..... 1c. subsp. *fosbergii*
- 1'. Inflorescence of racemosely arranged pedunculate racemes, umbels or glomerules. (subg. *Serianthes*).
 2. Flowers in racemosely arranged racemes ; stamens white or cream to brownish-grey ; pods glabrous or minutely puberulous ; outer layer of pod thin and flaky, inner layer woody ; main vein of leaflets diagonal across at least the middle third of the leaflet rather than parallel with the margins. (sect. *Serianthes*)¹.
 3. Calyx with yellowish brown indument like corolla ; tube of corolla usually not projecting beyond the calyx ; pod swollen over the seeds ; valves with hardly branched main veins ; main vein of leaflets strongly diagonal for more than the middle third of the leaflet..... 2. *S. grandiflora*

1. The two imperfectly known species 1 : *S. vitiensis* A. Gray which has obtuse leaflets and valves of pods with raised, branching veins from the dorsal margin and 2 : *Serianthes* sp. in obs. which has sharply acute leaflets will probably key out in this section.

- 3'. Calyx with rusty brown indument darker than corolla; tube of corolla projecting beyond the calyx; pod not swollen over the seeds; valves with branched main veins; main vein of leaflets diagonal across about the middle third of the leaflet.
4. Pinnae ca. 20 pairs per leaf; corolla 27-36 mm long; pod 6-6.5 cm wide. 3. *S. robinsonii*
- 4'. Pinnae 6-12 pairs per leaf; corolla 24-29 mm long, pod 4.2-6 cm wide.
5. Petiolar gland raised in its distal part only; leaflets usually puberulous beneath; calyx often indented half way down; pod with strongly raised margins 4. *S. hooglandii*
- 5a. Calyx (8-) 10-12 mm long; corolla 27-28 mm; pod with distinct veins. 4a. subsp. *hooglandii*
- 5a'. Calyx 5-6 mm long; corolla ca. 18 mm; pod with hardly raised veins. 4b. subsp. *floridensis*
- 5'. Petiolar gland fully raised; leaflets glabrous or nearly so beneath; calyx teeth less than half as long as the calyx; pod with hardly raised margins. 5. *S. kanehirae*
- 2'. Flowers in racemosely arranged pedunculate glomerules or umbels; stamens whitish in the lower part and red distally; outer layer of pod coriaceous, rigidly chartaceous to woody; inner layer \pm parchmentlike; main vein of leaflets \pm parallel to the margins. (sect. *Calycina*.)
6. Tube of corolla shorter than to equalling the calyx.
7. Pinnae (15-) 20-30 "pairs" per leaf; leaflets up to 38 "pairs" per pinna, 1-3.5 mm wide. 12. *S. petitiana*
- 7'. Pinnae 4-12 "pairs" per leaf; leaflets up to 18 "pairs" per pinna, 3.7-10 mm wide.
8. Leaflets glabrous with a few scattered hairs only; lower surface not papillose, calyx 6-8 (-10) mm long. 17. *S. margaretae*
- 8'. Leaflets tomentose to hirsute by patent hairs; lower surface papillose; calyx 11-15 mm long. 13a. *S. calycina* var. *calycina*
- 6'. Tube of corolla distinctly longer than the calyx.
9. Calyx and corolla tubular to subtubular, pod¹ with dense, oblique, conspicuous, transverse veins. 11. *S. myriadenia*
- 9'. Calyx cup-shaped, funnel-shaped, subcampanulate to campanulate; corolla funnel-shaped; pod with hardly visible transverse veins.
10. Pod with strongly raised margins, \pm continuous within... *S. sp.* in obs. No. 3
- 10'. Pod without strongly raised margins, discontinuous within.
11. Leaflets glabrous beneath or with a few scattered hairs only.
12. Leaflets (3.5-) 5-12 mm wide, distal part of calyx usually two-lipped; valves of pod with woody epicarp. 16. *S. germainii*
- 12'. Leaflets 2.5-6 mm wide, distal part of calyx not distinctly two-lipped; valves of pod with a chartaceous to thinly woody epicarp.
13. Petiolar gland raised, flat, circular 1-2 mm in diameter, lateral veins of leaflets prominulous to hardly conspicuous beneath; areole of seeds closed. 7. *S. ebudarum*
- 13'. Petiolar gland hardly raised, slightly concave 0.6-1 mm in diameter, circular to elliptic, lateral veins of leaflets prominent beneath; areole of seeds open towards the micropyle. 9. *S. melanesica* var. *macdanielsii*
- 11'. Leaflets hairy beneath.
14. Calyx 5 mm long, cup-shaped. 8. *S. tenuiflora*
- 14'. Calyx more than 5 mm long, narrowly campanulate to campanulate.

1. Pod unknown in *S. tenuiflora* Benth.

15. Leaflets densely reddish pilose beneath; lowest part of corolla-tube glabrous, seeds with open areole... 9. *S. melanesica* var. *melanesica*
15'. Leaflets puberulous to sericeous beneath; lowest part of corolla-tube hairy.
16. Valves of pod with chartaceous or thinly woody epicarp, pod 2.7-4 cm wide.
17. Seeds with a closed areole..... 7. *S. ebudarum*
17'. Seeds with open areole.
18. Leaflets 1.5-3.1 mm wide, base half rounded/half cuneate; leaflets papillose beneath; seeds to 6 mm wide.... 6. *S. nelsonii*
18'. Leaflets (4-) 6-10 (-15) mm wide, base asymmetrically truncate; leaflets not papillose beneath; seeds 9.5 mm wide 10. *S. rurutensis*
16'. Valves of pod with woody, thick epicarp; pod 3.7-7.2 cm wide.
19. Leaflets with patent hairs beneath, hirsute..... 13b. *S. calycina* var. *kaalaensis*
19'. Leaflets with appressed hairs beneath, appressed-puberulous to sericeous.
20. Leaflets papillose beneath; calyx 6-8 (-13) mm long; corolla (15-) 20-30 mm long; pod (4-) 5.4-7.2 cm wide. 14. *S. sachetae*
20'. Leaflets not papillose beneath; calyx 11-13 mm long; corolla 32-37 mm long; pod 3-4.5 cm wide..... 15. *S. lifouensis*

Insufficiently known species, not included in the key :

- *S. vitiensis* A. Gray.
- *Serianthes* sp. in obs. No. 1 from the New Hebrides.
- *Serianthes* sp. in obs. No. 2 (= *S. melanesica* var. *yunckeri* Fosb.).

A. *Serianthes* subg. *Minahassae* Nielsen

Bull. Mus. natn. Hist. nat., Paris, 4^e sér., sect. B, Adansonia, 5 (3) : 328 (1983).

Inflorescence a panicle of pedunculate spikes. Stamens white or cream. Pod with a thinly woody epicarp and a parchmentlike endocarp, nearly not segmented within. Pods tardily dehiscent to indehiscent.

TYPE : *Serianthes minahassae* (Koorders) Merrill & Perry.

1. *Serianthes minahassae* (Koorders) Merrill & Perry

J. Arn. Arbor. 23 : 393 (1942); VERDC., Man. N. G. Legumes : 198 (1979); KANIS, Brunonia 2 : 297 (1980), fig. 1.

— *Albizia minahassae* KOORD., Minah. : 416 (1898); FOSB., Reinwardtia 7 : 81 (1965).

TYPE : Koorders 17650, Celebes, Minahassa, Menado : "Oerwoud bij Kajoewatoe"; alt. 500 m (holo-, BO; iso-, L).

DISTRIBUTION : Celebes, Sumbawa, Ceram, Talaud Isl., New Guinea, Bismarck Archipelago and the Solomon Islands.

NOTES : A sterile specimen, *Oldenburg Herb. Bot. var. 30* from Ceram (Kairatoe) is preserved at the herbarium bogoriense. It is not referable to subspecies and is the first record of this species from Ceram.

VERDCOURT (*l.c.*) was the first to include the easternmost material of this species, formerly described as "*Albizia melanesica*" by FOSBERG in this species. KANIS (*l.c.*) later distinguished between 3 subspecies, which are geographically isolated. The characters mentioned in the key are the most reliable in distinguishing the subspecies.

1a. subsp. **minahassae**

Petiolar gland 3-4.5 mm, elliptic, raised, sometimes cushion-shaped, never concave; leaflets (2-) 2.5-4 mm wide, main vein removed 1/3 to 2/5 of the width of the leaflet from the front margin; pod 11-21 × 2.8-4 (4.5) cm, tardily dehiscent; seeds 13-18 × 3-10 mm, elliptic to oblong.

DISTRIBUTION : Celebes, Talaud Isl., probably Sumbawa.

NOTES : The pod of *Kostermans 19152* from Sumbawa is 4.5 cm wide, which is more than usual in subsp. *minahassae*. The leaflets of this specimen are 2-2.5 mm wide with the main vein removed 1/3 of the width of the leaflet from the upper margin. *Kostermans 18715* and *19152* might as noted by KANIS (*l.c.* : 300) belong to a distinct subspecies.

KANIS (*l.c.* : 298) stated that precise collecting localities have not been given on the labels of KOORDERS' specimens. This is true for the duplicate sets distributed to various herbaria, but not for the first set, preserved at Herbarium Bogoriense, where the labels give information about precise localities, altitude, habit of the tree and vernacular names.

1b. subsp. **ledermannii** (Harms) Kanis

Brunonia 2 : 300 (1980).

- *Serianthes ledermannii* HARMS, Bot. Jahrb. 55 : 43 (1917).
- *Albizia minahassae* var. *ledermannii* (HARMS) FOSBERG, Reinwardtia 7 : 85 (1965).
- *Albizia minahassae* var. *proliferata* FOSB., *ibid.* 7 : 83 (1965); type : Brass 8076, S.E. New Guinea, Lower Fly River (holo-, BO; iso-, BM, BRI, L, LAE).
- *Albizia minahassae* var. *umbellata* FOSB., *ibid.* 7 : 84 (1965); type : Brass & Versteegh 13546, W. Irian, Idenburg River, Bernhard Camp (holo-, BO; iso-, BM, BRI, L, LAE).

Petiolar gland 1.5-2.5 (-3.5) mm, elliptic, raised, concave in the central part, rimmed; leaflets 4-7 × 4.5-2 (-2.5) mm, the main vein removed 1/3 or less of the width of the leaflet from the front margin; pod 9.5-18.5 × (2-) 2.5-4 cm, indehiscent; seeds not observed.

TYPE : *Lederman 7311*, northeastern New Guinea, "Pionierlager am Sepik, Sumpfwald" (nekro-, B).

DISTRIBUTION : New Guinea, Aru Islands.

Note : A specimen, consisting of a mature pod and a seedling, collected by W. BAUERLEN in 1885 at Strickland River, New Guinea, is the first specimen collected of this species.

1c. subsp. **fosbergii** Kanis

Brunonia 2 : 302 (1980).

— *Albizia melanesica* Fosb., Reinwardtia 7 : 85 (1965); type : *Kajewski 2143*, Bougainville Isl. (holo-, BISH; iso-, BM, BO, BRI, G, L).

Petiolar gland 2-4 (-5) mm long, elliptic, raised, rimmed, concave, sometimes with a saddle-like depression in the central part; leaflet 5.5-9 × (1.5-) 2-3 (-3.5) mm, main vein subcentral to removed 1/3 of the width of the leaflet from the front margin; pod 16-22 × (4.5-) 5-7 cm, indehiscent. Seeds 17-26 × 6.5-9 mm, oblong.

TYPE : *Kajewski 2143*, Solomon Islands, Bougainville Isl., Koniguru, Buin, 900 m (holo-BISH; iso-, BM, BO, BRI, G, L).

B. Serianthes subg. **Serianthes**

Inflorescences of racemosely arranged pedunculate racemes, umbels or glomerules. Pods not as above, indehiscent.

Sect. **Serianthes**

Inflorescence a compound raceme. Stamens white or cream. Pod with a thin and flaking epicarp and a thick, woody endocarp; seeds arranged in widely separated compartments.

TYPE : *Serianthes grandiflora* Benth.

2. **Serianthes grandiflora** Benth

Lond. J. Bot. 3 : 225 (1844), *p.p.*, excl. syn. *Acacia myriadenia* Bertero ex Guillemain *nom. inval.*; Trans. Linn. Soc. London 30 : 599, 635 (1875); VAN STEENIS, Fl. Males. Bull. 5 (24) : 1846 (1969).

— *Serianthes dilmyi* Fosb., Taxon 8 : 65 (1959); Reinwardtia 5 : 300 (1960); Taxon 12 : 34 (1963); BACK. & BAKH. f., Fl. Java 1 : 550 (1963); Fosb., Taxon 18 : 351 (1969); WHITMORE, Tree Fl. Malaya 1 : 289 (1972); VERDC., Man. N.G. Legum. : 197 (1979); KANIS, Brunonia 2 : 312 (1980); *nom. inval.*, based on same type as *S. grandiflora* Benth.

TYPE : *Wallich Cat. No. 5285*, Singapore (holo-, K).

DISTRIBUTION : Peninsular Thailand (new record!), Malay Peninsula, Philippines, islands off Borneo (Sabah, new record), Sumatra & Java, Celebes, Moluccas, W. Irian and Manus Islands.

NOTES : The flower size is quite variable. FOSBERG (1960 : 299) "corolla more than 30 mm"; KANIS (*op. cit.* : 313) "corolla : (30-) 32-38 (-40) mm". The material studied by me (including that studied by FOSBERG and KANIS) has corollas ranging from 23-32 mm long. *Beccari s.n.*, *Schram in BW 10626* and *Griffith s.n.* all have corolla 23-30 mm long. The calyx of the New Guinea specimens seems to be more stout; but more material is needed. KANIS (*l.c.*) notes that this species has leaflets without distinct basal nerve, but

two or three additional nerves can be seen with the unaided eye, similar to that (those) found in *S. hooglandii* and *S. kanehirae*.

Nomenclatural note : As pointed out by VAN STEENIS (1969), *Acacia myriadenia* Bertero ex Guillemín is invalidly published as it was not accepted by the author in the original publication and moreover a so-called provisional name. *Serianthes grandiflora* (Wall. ex Benth) is thus to be kept as the correct name for the species later named *S. dilmyi* by FOSBERG (1960) as BENTHAM'S (1844) inclusion of an invalid name in the synonymy of *S. grandiflora* does not affect the validity of the latter name. The type of the genus is then *Serianthes grandiflora* Benth (cf. FOSBERG, 1960). KANIS'S (1980) decision to regard *Acacia myriadenia* Bertero ex Guillemín validly published is against both the words and the spirit of the International Code of Botanical Nomenclature art. 34.1 (a & b). The note under taxon 319 by GUILLEMIN (Zeph. Taitensis : 66, 1837) " Une seule feuille de cette plante est trop insuffisante pour qu'il soit possible de se faire une idée exacte de l'espèce que BERTERO avait crue nouvelle et qu'il avait nommée *Acacia myriadena* " clearly shows that GUILLEMIN did not accept the name " ... l'espèce que Bertero avait crue nouvelle ".

ADDITIONAL SPECIMENS. — THAILAND : *G. Congdon 674*, Peninsular, Ko Tarutao, Rawi, 17.6.1980, fr. (AAU). — BORNEO : *Madani in SAN 90772*, Sabah, Kunak distr., Pulau Bohayan, 9.7.1979, fl. (L).

3. *Serianthes robinsonii* Fosberg

Reinwardtia 5 : 301 (1960), *p.p.* (excl. N. Guinea specimens) ; KANIS, *Brunonia* 2 : 304, *fig. 2* (1980).

TYPE : *Robinson 2045*, Moluccas, Amboina, Hatiwe (holo-, US).

DISTRIBUTION : Moluccas : Amboina, Ceram.

NOTES : This species is still poorly known. The type *Robinson 2045* from Amboina is in fruit only ; the pod is 20 × 6 cm (FOSBERG, *l.c.*, 7-8 cm wide (in diagnosis), (5-) 7 (-8) cm wide (in English description). As noted by KANIS the leaves were taken from a young tree. The floral dimensions given by FOSBERG (*l.c.*) must have been taken from the TEIJSMANN and OLDENBURG collections deposited at Bogor. In *Oldenburg 37* the corolla is 27-36 mm (FOSBERG diagnosis " corolla 30 mm long "), but the specimen is fragmentary and specimens with young flowers and inflorescences are needed. For further notes please see KANIS (*l.c.*).

4. *Serianthes hooglandii* (Fosberg) Kanis

Brunonia 2 : 307 (1980) ; VERDC., *Man. N. Guinea Legum.* : 198 (1979).

— *Serianthes kanehirae* FOSB. var. *hooglandii* FOSB., *Reinwardtia* 5 : 303 (1960).

— *S. robinsonii* auct. non FOSB. : FOSB., *Reinwardtia* 5 : 302 (1960), *quoad spec. Hoogland 4968*.

TYPE : *Hoogland 4331*, New Guinea, Milne Bay distr., Cape Vogel Peninsula (holo-, US; iso-, A, BISH, BO, CANB, G, K, MEL, NSW).

NOTES : This species is recognized primarily by the pubescent lower leaflet-surface, which occasionally might be quite glabrous (*Streimann & Kairo in NGF 29323*), the cup-

shaped to obconical calyx, which is often indented half way down and the strongly raised margins of the pod. It was originally described as a variety under *S. kanehirae* by Fosberg (*l.c.*) but differs from that in flower and pod characters. The palynological data give some very useful indications about the affinities of *S. hooglandii* and *S. robinsonii*.

KANIS (*l.c.*) distinguishes two geographically isolated subspecies.

4a. subsp. **hooglandii**

DISTRIBUTION : E. New Guinea and D'Entrecasteaux Isl.

4b. subsp. **floridensis** Kanis

Brunonia 2 : 312 (1980).

TYPE : *R. Mauriasi* & coll. in BSIP 18184, Solomon Islands, Florida Group, Sandfly Islands (holo-, LAE ; iso-, K).

DISTRIBUTION : Sandfly Island (Florida Group of the Solomon Islands).

5. **Serianthes kanehirae** Fosberg

Reinwardtia 5 : 302 (1960) ; KANIS, Brunonia 2 : 296, fig. 2 (1980), in key.

— *S. kanehirae* var. *yapensis* Fosb., *ibid.* : 303 (1960) ; type : *Alvis 99*, Caroline Islands, Yap Islands (holo-, US ; iso-, L, NY).

Tree up to 20 m high and with trunk up to 1.5 m in diameter ; stipules not observed. Leaves : rachis 12-26 cm, shortly tomentellous, petiole 4-8 cm, gland 0.8-1.7 cm above the base, 1-2.5 mm in diameter/long, circular to elliptic, fully raised, concave, in the central part ; pinnae 8-12 pairs opposite to subopposite, 3-13.5 cm ; leaflets 6-24 "pairs" per pinna, 7-17 × 3-6 mm, asymmetrically oblong, glabrous or with a few scattered hairs beneath or ciliate at the base only, not papillose ; base asymmetrically truncate to half rounded-half cuneate ; apex asymmetrically rounded, main vein starting closer to the back margin, diagonal across about the middle third of the leaflet.

Inflorescence : Panicles to 13.5 cm long composed of racemes 6-9 cm long, bearing the pedicellate flowers in the distal half pedicels 5-7 mm. Flowers : calyx rusty brown, 8.5-11 mm, obconical to subcampanulate, tomentose ; teeth unequal, 2-4 mm, triangular, broadly acute ; corolla creamish white, 23-26 mm, funnel-shaped, long tomentose, tube exerted beyond the calyx ; lobes 9-12 mm, oblong, acute ; stamens cream-white up to 45 mm, staminal tube shorter than the corolla.

Pod dark brown 13-18.5 × 4.2-5.8 cm, ovate-oblong, woody, shortly tomentulose ; margins not thickened ; valves not conspicuously swollen over the seeds ; the epicarp peeling off, the endocarp with numerous hardly conspicuous veins and a few raised (ca. 4) prominent ones which fork near middle of the valve ; endocarp thin but woody. Seeds 12.5-14 × 8.5-10 mm, ± elliptic, biconvex ; areole 10-12 × 4.5-6.5 mm, elliptic ; pleurogram open towards the micropyle.

TYPE : *Fosberg 25770*, Palau Islands, Korrer Isl. (holo-, US ; iso-, BISH, L, NY).

DISTRIBUTION : Caroline Islands : Palau group and Yap Island (KANIS, *op. cit.* : fig. 2).

ECOLOGY : Rain-forest also on volcanic soil ; alt. sea-level to 110 m.

NOTES : FOSBERG distinguished var. *yapensis* by the following characters (1960 : 303) : “ longer leaf rachis, to 30-35 cm long, pinnae 15 pairs, leaflets about 22-30 pairs on a pinna, 12 mm long, 5 mm wide, calyx about 10 mm wide at top ; corolla small 15-18 mm long ”. The isotypes have leaf rachis up to 19.5 cm long ; pinnae 10 pairs ; leaflets 8-19 “ pairs ” per pinna, 9-14 × 4-5.5 mm ; calyx 7-8 mm wide at top ; corolla 23 mm long. Because of the variation amongst duplicates I have not recognized var. *yapensis*. I do not agree in the dimensions given for this species in KANIS' key to the Malesian species (Brunonia 2 : 296, 1980) ; the only reliable diagnostic characters found are included in the key above.

Sect. **Calycina** Nielsen

Bull. Mus. natn. Hist. nat., Paris, 4^e sér., sect. B, Adansonia, 5 (3) : 328 (1983).

TYPE : *Serianthes calycina* Benth.

Inflorescence a panicle of pedunculate diads, triads or tetrads of flowers. Stamens white at base and normally reddish distally. Pods with coriaceous, rigidly chartaceous or woody epicarp, endocarp ± parchmentlike ; seeds in widely separated compartments.

6. ***Serianthes nelsonii*** Merrill

Philipp. J. Sci., Bot. 15 : 542 (1919) ; KANEHIRA, Fl. Micronesica : 150, fig. 52 (1933) ; Fosb., Reinwardtia 5 : 304 (1960) ; STONE, Micronesia 6 : 304 (1970) ; KANIS, Brunonia 2 : 293 & 294 ; fig. 1 (1980).

Tree up to 20 m high ; trunk up to 2 m in diameter ; bark smooth and white ; stipules not observed. Leaves : rachis (6-) 10-21 cm, tomentose ; petiole 3-6.5 cm, gland 0.8-2.2 cm above the base, 0.4-1 mm in diameter, circular, flat, raised ; pinnae 10-21 pairs, opposite to subopposite (2.5-) 3-7.5 cm ; leaflets 7-28 “ pairs ” per pinna, 4-8 × 1.5-3.1 mm, oblong ; base asymmetrically truncate, apex rounded ; upper surface appressed puberulous ; lower surface densely sericeous to densely hirsute and papillose ; main vein starting subcentrally at the base, closer and parallel to the front margin ; lateral veins inconspicuous.

Inflorescence : panicle to 10 cm long ; peduncles 1.5-2 cm long bearing diads or triads of pedicellate flowers, pedicel 1.5-3 mm. Flowers : calyx greenish white 5.5-9 mm, narrowly campanulate, usually bifid, tomentose ; teeth usually 3 (4 of the teeth being united 2 & 2 for a longer distance) ; lobes 1-2 mm, triangular-ovate, acute ; corolla greenish white 16-21 mm, funnel-shaped, hirsute, lobes 3-8 mm, ovate-narrowly ovate to oblong, acute ; corolla-tube strongly exerted beyond the calyx, stamens white at base purplish red distally up to ca. 50 mm ; staminal tube shorter than the corolla.

Pod 7.5-8 × 2.7 cm, oblong, densely yellow-brown, tomentose, valves with numerous hardly conspicuous transverse veins, slightly swollen over the seeds, margins slightly raised ; epicarp coriaceous rather thin, endocarp parchmentlike. Seeds dark-brown, 11 × 6 mm, irregularly oblong, biconvex ; areole 10 × 4 mm, pleurogram open towards the micropyle.

LECTOTYPE : *Nelson 240*, Marianas Islands : Guam (NY ; iso-, A, BISH, BO).

DISTRIBUTION : Marianas Isl. : Guam & Rota.

ECOLOGY : Scrubby forest on rough limestone ; alt. up to 170 m.

NOTES : FOSBERG (*l.c.*) selected no type. The holotype was probably destroyed in Manila during World War II. *Nelson 240* (NY) has the original field data included on the label and is accordingly selected as type.

This species is closely related to *S. ebudarum* from the New Hebrides, but differs from that species in having papillose lower leaflet surface, the calyx widened in the distal part, the yellow brown tomentum of the pods and the open pleurogram of the seed.

7. *Serianthes ebudarum* Fosberg

Reinwardtia 5 : 307 (1960).

— *Serianthes melanesica* FOSB. var. *yunckeri* FOSB., *p.p.*, *ibid.* : 313 (1960), *quoad specimen Kajewski 41*.

— *S. melanesica* auct. non FOSB. : KANIS, *Brunonia* 2 : 290 (1980), *quoad Whitmore in BSIP 1634, 1702*.

Tree up to 20 m high, up to 0.8 m in diameter ; stipules not observed. Leaves : rachis 8-26 cm, tomentose to pilose ; petiole 2-5.8 cm, gland 0.6-2 cm above the base, 1-2 mm in diameter, circular, raised, flat or with slightly raised margins ; pinnae 5-10 (-14) "pairs" opposite to subopposite, (1.5-) 2.5-8 cm ; leaflets 6-22 "pairs" per pinna, (5-) 6-12 × 2.5-5 mm, oblong ; base asymmetrically truncate to half truncate-rounded/half cuneate ; apex rounded, occasionally emarginate ; both surfaces glabrous or upper puberulous ; lower surface with a few scattered hairs to sericeous to hirsute, not papillose ; main vein sub-central at base, not diagonal, lateral veins prominulous to hardly conspicuous.

Inflorescence : panicles to 4.5 cm long ; peduncles 1.2-2.1 cm, bearing diads or triads of subsessile flowers. Flowers : calyx olive, 5-9 mm, narrowly campanulate to subtubular, tomentose ; teeth 5, unequal, 1-2 mm, triangular, acute ; corolla cream, 15-26 mm, funnel-shaped, woolly, tube slightly to strongly exserted ; lobes (5-) 6-10 mm, oblong to narrowly lanceolate ; stamens white below, purple to pink above, to about 45 mm long, staminal tube not exserted.

Pod brown, 9-12.5 × (2.7-) 3-4 cm, oblong, with slightly raised margin ; densely shortly tomentose by glandular hairs, valves with hardly conspicuous to prominulous, numerous, parallel, slightly oblique veins ; epicarp thinly woody, endocarp parchment-like. Seeds 15-16.5 × 7-7.5 mm, ovate-elliptic to oblong, to 3.5 mm thick, biconvex ; areole 11.5 × 13 × 4-4.5 mm, elliptic to oblong, pleurogram closed towards the micropyle.

TYPE : *Kajewski 743*, New Hebrides : Aneitum Isl., Anelgauhat Bay (holo-, NY ; iso-, A, BISH, K, US).

DISTRIBUTION : New Hebrides and Santa Cruz Islands (Vanikoro).

ECOLOGY : Rain-forest on rich soil up to 400 m alt. ; one of the dominants of the Kauri forests.

NOTES : The indumentum of leaflets shows a considerable variation in this species. The type, *Kajewski 743*, from Aneityum has glabrous leaflets ; the paratype *Kajewski 312*

from Erromanga has faintly puberulous leaflets ; the specimens collected on Tanna Island and Vanikoro have sericeous to hirsute leaflets. In other leaf characters and in those of flowers and pods the specimens agree and they are kept in the same, admittedly variable species. *Kajewski 41* was referred to *S. melanesica* var. *yunckeri* by FOSBERG probably because of the hirsute leaflets. Material collected on the Santa Cruz Islands, *Whitmore in BSIP 1634, 1702* (cited by KANIS (*l.c.*) as *S. melanesica*) belongs here.

8. *Serianthes tenuiflora* Benth

Trans. Linn. Soc. London 30 : 599 (1875) ; FOSB., *Reinwardtia* 5 : 307 (1960) ; KANIS, *Brunonia* 2 : 289 (1980).

Leaves : rachis up to ca. 23 cm long, tomentose ; petiole ca. 5 cm long ; gland 2 cm above the base, 1-2 mm in diameter, circular, raised, sessile ; pinnae more than 10 pairs, opposite-subopposite, up to 11 cm long ; leaflets 15-20 pairs per pinnae, alternate, ca. 12-16 × 5-7 mm, oblong, curved towards the front, base half rounded/half cuneate ; apex rounded ; upper surface puberulous, lower surface faintly sericeous ; main vein starting subcentrally at the base, parallel and slightly closer to the front margin ; lateral veins prominulous.

Inflorescence : peduncle 2.2 cm long bearing triads of pedicellate flowers, pedicels ca. 5 mm long. Flowers : calyx 3-5 mm long, cup-shaped, pubescent ; teeth about 1 mm long, triangular, acute ; corolla 11-15 mm long, narrowly funnel-shaped ; lobes ?, corolla-tube exerted beyond the calyx ; stamens more than 20 mm long, tube shorter than the corolla ; ovary ?

Pod and seeds not known.

TYPE : *Cunningham s.n.*, " Ins. Pacif. " (holo-, K).

DISTRIBUTION : According to KANIS (*l.c.*) CUNNINGHAM visited and collected at Norfolk and Philip Islands between May and September 1830. The species has never been recollected from there, but should be looked for.

NOTES : This species is still imperfectly known. The type is a specimen with very young flowers, which probably have been forced open during the drying process. The dimensions given above are thus in need to be confirmed. Judged from the general facies of the specimen this species has its closest relative in *S. myriadenia*, which has the same kind of curved leaflets and narrow corollas.

9. *Serianthes melanesica* Fosberg

Reinwardtia 5 : 312 (1960), *p.p.*, *excl. var. samoensis et var. lifouensis.*

TYPE : *Degener 15041*, Fiji Islands : Viti Levu (holo-, NY ; iso-, A, BISH, K, US).

DISTRIBUTION : Fiji Islands, Tonga.

DISCUSSION : FOSBERG (1960 : 321) pointed out the intricate relationship of *S. melanesica* with *S. myriadenia*, *S. sachetae* and *S. ebudarum*. In the present treatment only the Fiji and Tonga material mentioned by FOSBERG is referred to *S. melanesica*. FOSBERG

recognised three varieties from Fiji, var. *melanesica*, var. *macdanielsii* and var. *meeboldii* (not mentioned in the key). The length of the leaf rachis was used as distinguishing character between var. *meeboldii* and the other Fiji varieties. *Damanu KU 16* (K) from Kandavu Island has leaf rachis 17.5-18 cm long, leaflets densely puberulous beneath; calyx 12 mm, subcampanulate; corolla 30 mm, funnel-shaped. The length of the rachis refers this specimen to var. *meeboldii* sensu FOSBERG, the indumentum to var. *melanesica*. Var. *meeboldii* is based on *Meebold 16465* from Suva, Viti Levu. The holotype at Kew and the isotype at BISH are sterile and rather fragmentary. The variety is defined by the size of the calyx and leaflet size and indumentum. Calyces can be seen in *Horne 267* (K), the only flowering material cited by FOSBERG. The figure "2" is written very unreadable on the duplicate at GH and it looks as if is numbered "367"; FOSBERG cited *Horne "367"* under var. *macdanielsii*. With only two collections and no fruiting material of this variety available and with the usually longer leaves of saplings in mind it seems better to refer it to var. *macdanielsii*. Studies should be made in the field to reveal if the length of the leaf rachis has any taxonomic significance.

The specimens referred to var. *macdanielsii* in the present treatment were nearly all referred to var. *melanesica* by FOSBERG (*l.c.*); I have kept var. *macdanielsii* as a distinct variety because of the glabrous to very faintly puberulous leaflets and the tendency to a sublateral stalk of the pod.

a. var. **melanesica**

Tree to ca. 27 m high; trunk with whitish brown bark; stipules not observed. Leaves: rachis 6.5-15 (-22) cm long, tomentose; petiole 2.5-4.5 cm, gland 0.6-1.1 cm above the base, (0.6-) 1-2 mm in diameter, circular, concave, sunken; pinnae 5-12 "pairs", alternate to opposite (1.8-) 3.2-9.5 (-12) cm; leaflets 7-16 (-22) pairs per pinna (4-) 5-21 \times (2-) 3-7 mm, oblong; base half truncate-rounded/half cuneate to asymmetrically truncate; apex rounded, emarginate; upper surface faintly pilose to puberulous, lower surface densely puberulous to densely pilose, not or only faintly papillose; main vein subcentral at the base, lateral veins \pm prominent beneath.

Inflorescence: panicle to 17 cm long; peduncles to 2 cm long bearing diads or triads of pedicellate flowers; pedicel to ca. 1.5 mm long. Flowers: calyx 8.2-10 (-12) mm, campanulate-subcampanulate (very rarely cylindrical), tomentose, teeth to 3 mm, triangular, acute, corolla yellowish 22-25 (-30?) mm funnel-shaped, sericeous in the distal part, glabrous in the proximal (hidden) part; lobes 5-10 mm, oblong, acute; corolla-tube exerted beyond the calyx; stamens crimson in the distal part, ca. 45 mm, tube equalling the corolla.

Pod brownish 7.5-9 \times (3.2-) 3.8-4.2 cm, obovoid-oblong, with a subterminal stalk, often with a constriction, tomentose; valves with inconspicuous veins, margins slightly thickened; epicarp woody not flaking, endocarp parchmentlike. Seeds brownish-black, 15 \times 5 mm, elliptic to oblong; areole 12.5-13.5 \times 3-3.5 mm, elliptic; pleurogram open towards the micropyle.

TYPE: *Degener 15041*, Fiji Islands, Viti Levu (holo-, NY; iso-, A, BISH, K, L, US).

DISTRIBUTION: Fiji Islands: Viti Levu, Kandavu.

ECOLOGY: Lowland wet tropical rain-forest; alt. up to 800 m.

USAGES: The timber is usefull for canoes, paddles, etc. Seeds used in necklaces, also edible.

b. var. **macdanielsii** Fosberg

Reinwardtia 5 : 312 (1960).

— *Serianthes melanesica* Fosb. var. *meeboldii* Fosb., *ibid.* : 314 (1960); type : *Meebold 16465*, Fiji Isl., Viti Levu (holo-, K; iso-, BISH).

Differs from var. *melanesica* in the following characters :

Tree to 15 m high; trunk with grey-brown bark. Leaves : rachis 7.5-16 (-27) cm, petiole 1.5-4 cm, gland 0.7-1 cm above the base, 0.6-1 mm in diameter, circular to elliptic, slightly raised and concave; leaflets 9-19 \times (2.8-) 4-6 mm; glabrous or very faintly puberulous on both surfaces.

Flowers : calyx (5-) 6-9 mm, subcampanulate to cylindrical, tomentose; corolla (14-) 15-24 (-28) mm, funnel-shaped, tomentose in the distal part, glabrous in the proximal, lobes 5.5-7.5 mm long; stamens ca. 50-60 mm, pink distally, tube as long as or longer than the corolla-tube.

Pod 9-12 \times 3-4.3 cm, oblong, margins slightly raised. Seeds not observed ripe.

DISTRIBUTION : Fiji Islands : Viti Levu, Fulanga, Ongea Ndriti, Vanua Mblavu.

10. **Serianthes rurutensis** (F. Brown) Nielsen

Bull. Mus. natn. Hist. nat., Paris, 4^e sér., sect. B, Adansonia, 5 (3) : 329 (1983).

— *Serianthes myriadenia* PLANCHON ex BENTH. var. *rurutensis* F. BROWN, Bull. Bish. Mus. 130 : 105 (1935); Fosb., Reinwardtia 5 : 309 (1960).

Tree to 10 m high, trunk ca. 0.3 m in diameter; bark reddish brown, stipules not observed. Leaves : rachis 16-20 cm, tomentose; petiole 3-6 cm, gland 0.5 cm above the base, ca. 1.5 mm in diameter, circular, sunken into the rachis; pinnae 7-12 "pairs", opposite to subopposite (4.5-) 6-13 cm; leaflets 8-19 "pairs" per pinna, 16-23 \times (4-) 6-10 (-15) mm, broadly oblong, curved; base half rounded-half cuneate, apex rounded, often emarginate; upper surface puberulous; lower surface puberulous, not papillose, lateral veins prominent.

Inflorescence : panicle 14 cm, peduncles to 3 cm, bearing diads of sessile flowers. Flowers white : calyx 10 mm, subcampanulate, tomentose; teeth 3-5 mm irregularly triangular, acute; corolla 27-29 mm, funnel-shaped, tomentose; lobes 13.5 mm, oblong-elliptic; corolla-tube exerted; stamens ?.

Pod 11-13 \times 3-3.5 cm, oblong with a central stalk, constricted and with strongly thickened margins, densely tomentose; valves with numerous hardly visible transverse veins; exocarp thinly woody, endocarp parchmentlike. Seeds : 16.5 \times 9.5 mm, oblong-asymmetrical, rather flat, about 2 mm thick; areole 12.5 \times 4 mm, oblong, pleurogram open.

TYPE : *Stokes 185*, Austral Islands : Rurutu, Mato Arei (holo-, BISH, *n.v.*).

DISTRIBUTION : Austral Islands : Raivavae & Rurutu.

ECOLOGY : Dry woods on elevated, dissected coral limestone, alt. 10-140 m.

DISCUSSION : This entity was formerly included in *S. myriadenia* but differs in the following essential points : calyx 10 mm long, subcampanulate ; corolla funnel-shaped ; pod with thick margins ; seeds obovate-elliptic.

11. *Serianthes myriadenia* Planchon ex Benth

London J. Bot. 5 : 108 (1846) ; Trans. Linn. Soc. London 30 : 599 (1875), *p.p.* (*excl.* New Caledonian specimens) ; GRAY, Bot. U.S. Expl. Exp. : 485 (1854) ; DRAKE DEL CASTILLO, Ill. Fl. Ins. Mar. Pacif : 161 (1886), *p.p.* (*excl.* Fiji spec.) ; Fl. Pol. Française : 59 (1892) ; Fosb., Reinwardtia 5 : 308 (1960), *p.p.*, *excl.* var. *rurutensis* F. BROWN ; KANIS, Brunonia 2 : 315-316 (1980), note under *S. dilmyi*.

— *Acacia myriadenia* BERTERO ex GUILLEMIN, Zeph. Tait. in Ann. Sci. Nat., Bot. 2 (7) : 359 (1837), *nom. inval.* not intended.

Tree up to 20 m high ; trunk up to 0.5 m in d.b.h. ; bark grey ; stipules not observed. Leaves : rachis 18-23 (-30) cm, tomentose ; petiole 2.5-5.5 cm, gland 1.3-2 cm above the base, ca. 1 mm in diameter, circular, raised, flat to slightly concave ; pinnae 8-14 " pairs " per leaf, opposite to alternate, (3-) 6-14 cm ; leaflets 8-20 " pairs " per pinna, 9-19 × 5-10 mm, oblong, curved ; base half rounded-half cuneate ; apex rounded, emarginate ; both surfaces faintly sericeous to puberulous, not papillose ; main vein central at the base, parallel and closer to the front margin ; lateral veins prominent beneath.

Inflorescence : panicle to ca. 30 cm long ; peduncles 1.8-2.8 cm bearing triads or tetrads of sessile to pedicellate flowers ; pedicel to 4 mm long. Flowers creamy : calyx 5-7 mm, tubular to subtubular, tomentose ; teeth 0.5-1 mm, triangular, acute ; corolla (20-) 27-33 mm, subtubular to tubular, tomentose ; lobes 6-9 mm, lanceolate to oblong, acute ; corolla-tube strongly exerted ; stamens purple ; tube exerted.

Pod red-brown, 3-6 × 8-11.5 cm, irregularly oblong, often constricted at the middle, with slightly raised margins and a dense parallel oblique pattern of venation ; epicarp coriaceous to rigidly chartaceous, endocarp rigidly parchmentlike. Seeds 22-25 × 11.5-12.5 mm, broadly ovate, flat, 2-3 mm thick ; areole 18-21 × 6-8 mm, ovate-elliptic, pleurogram open.

TYPE : Bertero & Moerenhout *s.n.*, 1831, Tahiti (holo-, P).

DISTRIBUTION : Tahiti, Raiateae, Marquesas Isl. (Nuku Hiva).

ECOLOGY : Moist forest up to 700 m.

VERNACULAR NAME : " Faifai " (Tahiti).

NOTE : See under *S. grandiflora* (p. 94).

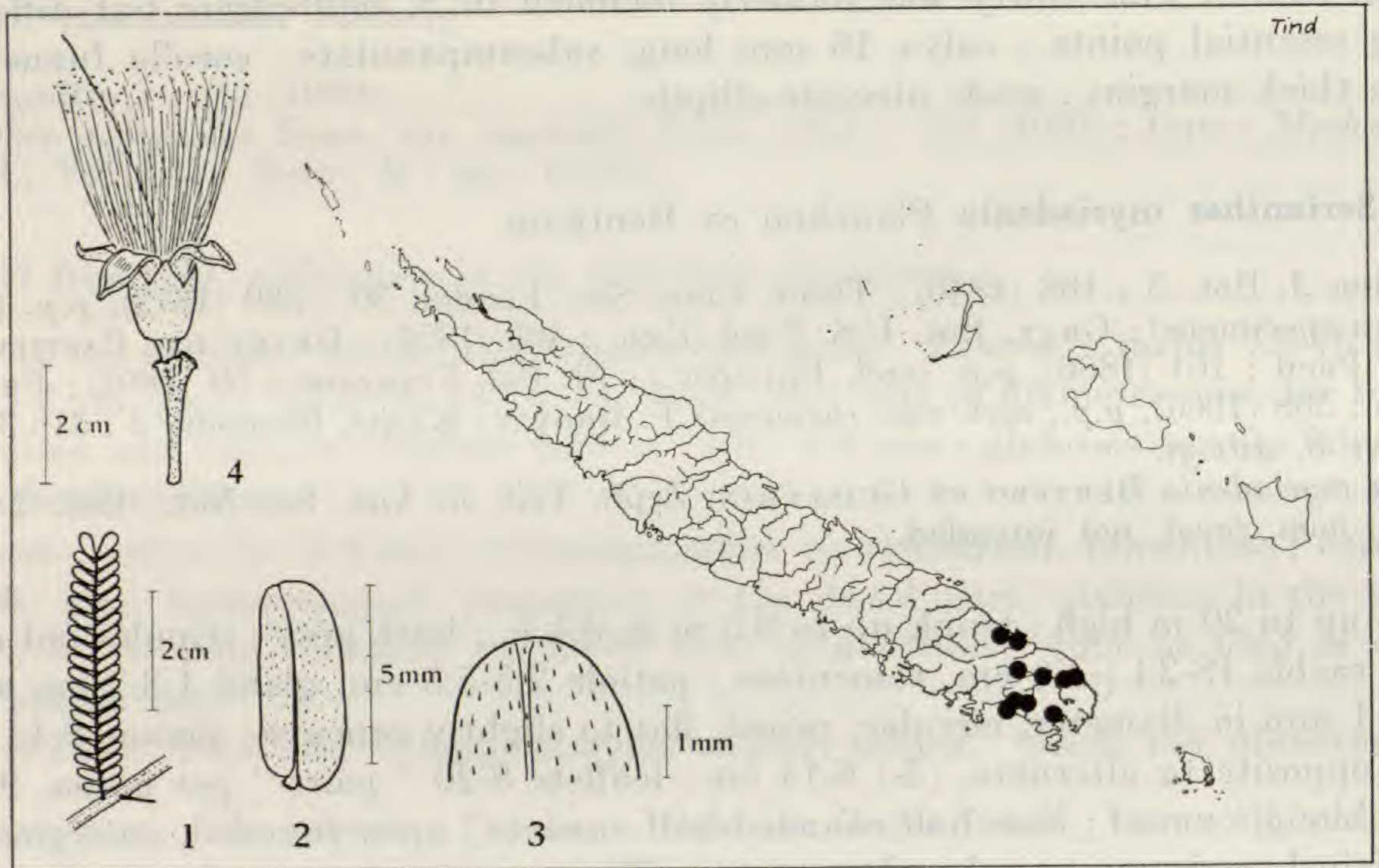
12. *Serianthes petitiana* Guillaumin

Notul. Syst. (Paris) 2 : 376 (1913) ; Fosb., Reinwardtia 5 : 304 (1960) ; NIELSEN, Fl. de la Nouvelle-Calédonie et dépendances 12 : 49 (1983).

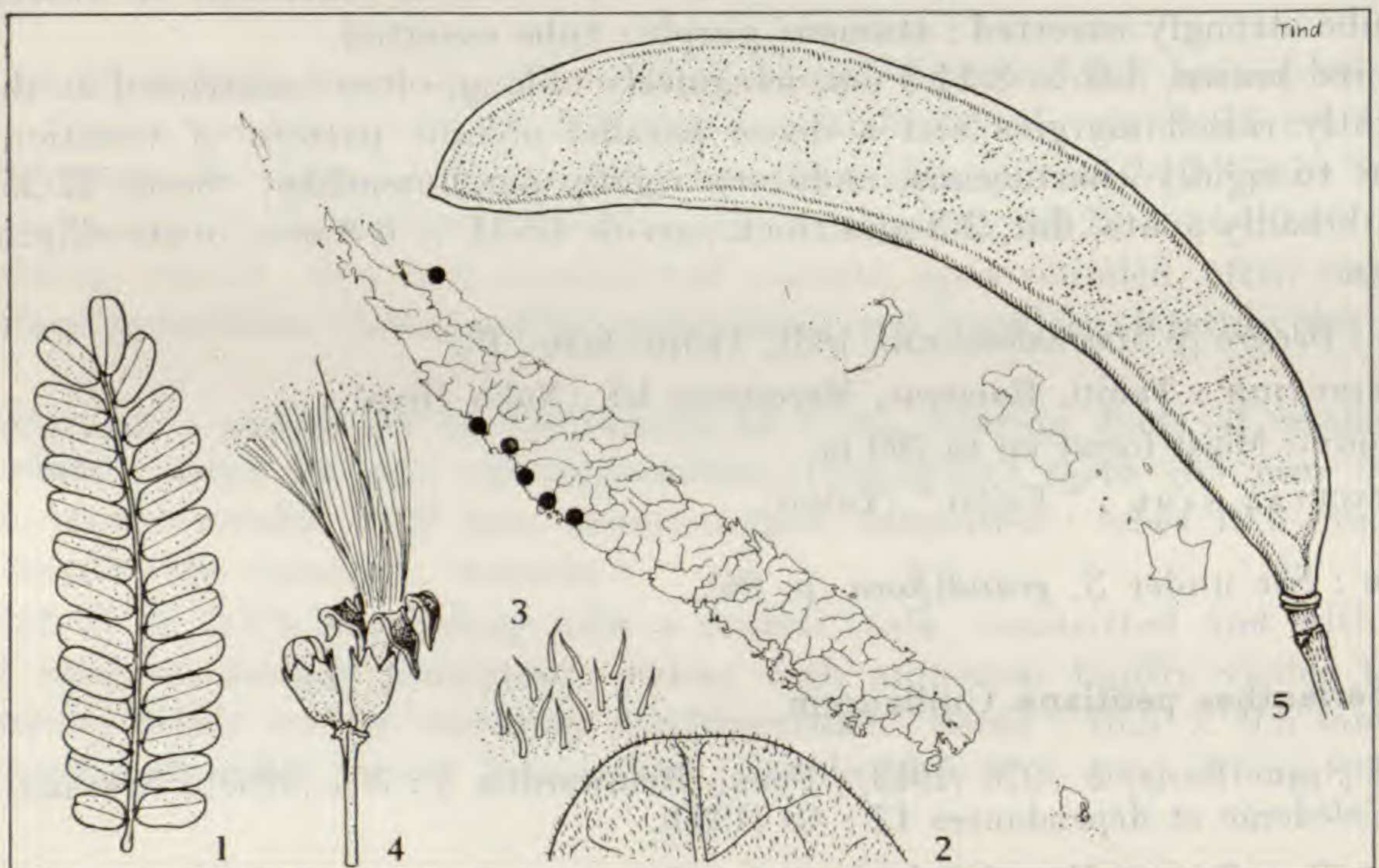
TYPE : Petit 2, *p.p.*, New Caledonia (holo-, P).

DISTRIBUTION : New Caledonia. — Pl. 13.

ECOLOGY : Recorded from hygrophilous forest, gallery forest, maquis on ultrabasic soil, alt. 0-300 m.



Pl. 13. — *Serianthes petitiana* Guillaumin : 1, pinna ; 2, leaflet, lower surface ; 3, apex of leaflet, lower surface ; 4, upper part of peduncle and flower. (*Petit 2*).



Pl. 14. — *Serianthes calycina* Benth. var *calycina* : 1, pinna $\times 1/2$; 2, apex of leaflet, lower surface $\times 6$; 3, detail of lower surface of leaflet showing indumentum and papillose epiderm $\times 25$; 4, upper part of peduncle and flowers $\times 1/2$; 5, pod $\times 1/2$. (1-4, *MacKee 28559* ; 5, *Deplanche 344*).

13. *Serianthes calycina* Benth

Trans. Linn. Soc. London 30 : 600 (1875); GUILLAUMIN, Notul. Syst. (Paris) 2 : 375, 376, fig. 1 (1913); FOSB., Reinwardtia 5 : 305 (1960); NIELSEN, Fl. de la Nouvelle-Calédonie et dépendances 12 : 52 (1983).

TYPE : Vieillard 419, Nouvelle-Calédonie : Gatope (holo-, K ; iso-, BM, MEL, NY, P).

a. var. *calycina*

DISTRIBUTION : Endemic to New Caledonia. — Pl. 14.

ECOLOGY : Recorded from scrub and forest on rocky, serpentine soil ; alt. up to 200 m.

b. var. *kaalaensis* Nielsen

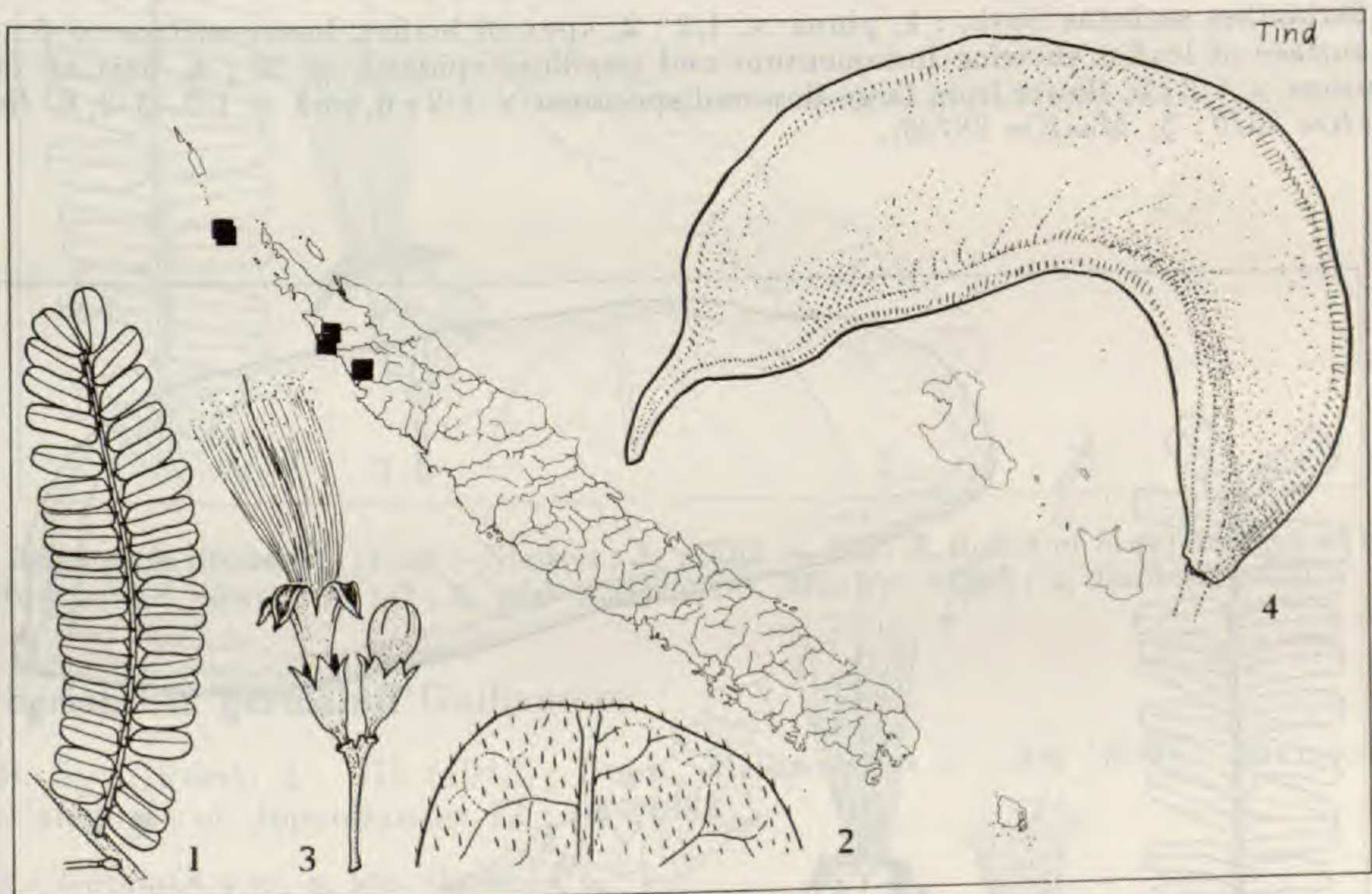
Fl. de la Nouvelle-Calédonie et dépendances 12 : 55 (1983).

— *Serianthes sachetae* auct. non FOSB. : FOSB., Reinwardtia 5 : 310 (1960), quoad Däniker 1233.

TYPE : MacKee 38981, New Caledonia, Paagoumène, 18.4.1981 (holo-, AAU ; iso-, P, NOU).

DISTRIBUTION : Endemic to the N.E. part of Nouvelle-Calédonie, probably on Yandé too. — Pl. 15.

ECOLOGY : Scrub on rocky, serpentine soil ; alt. up to 100 m.

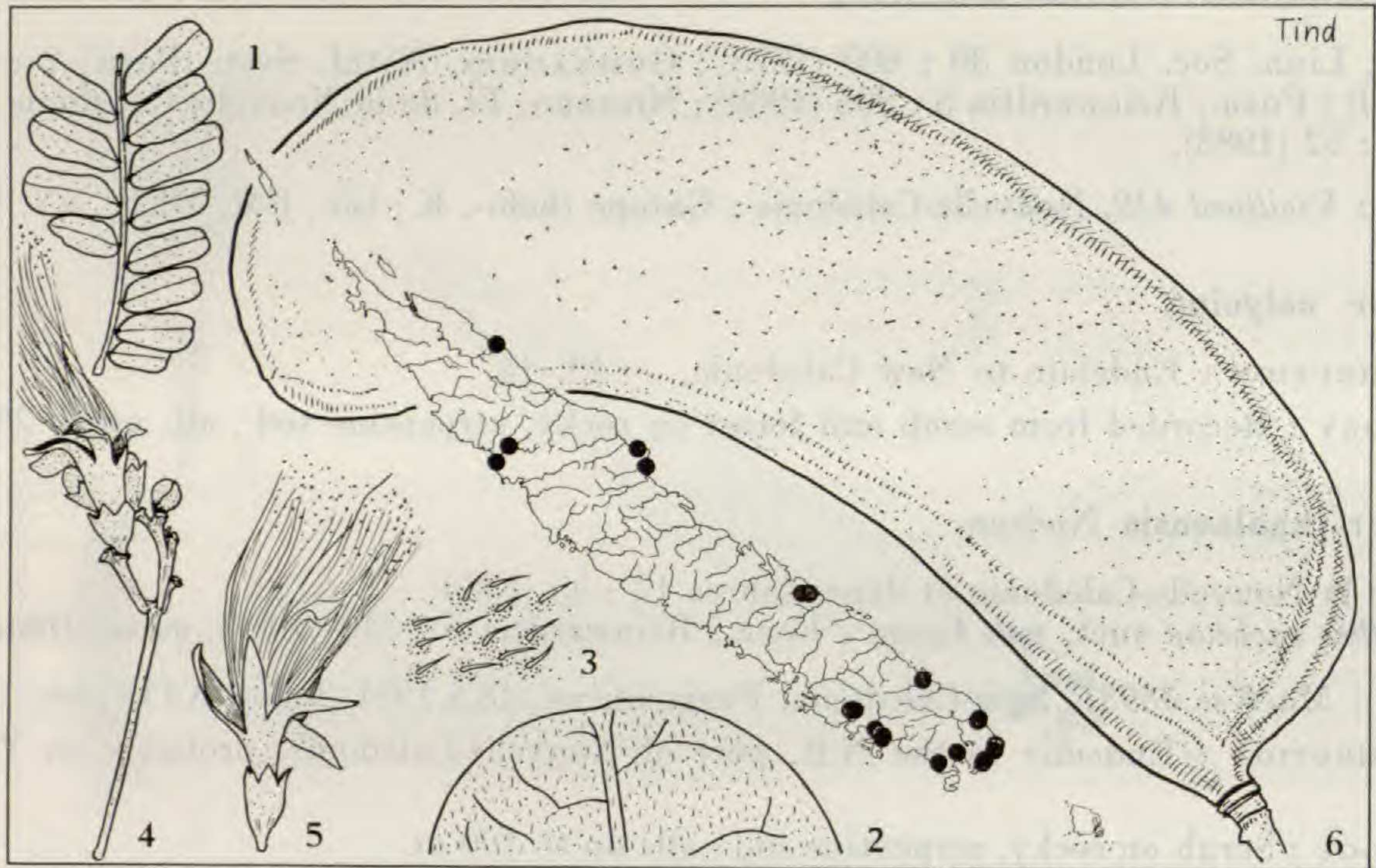


Pl. 15. — *Serianthes calycina* Benth. var. *kaalaensis* Nielsen : 1, pinna $\times 1/2$; 2, apex of leaflet, lower surface $\times 6$; 3, upper part of peduncle and flowers $\times 1/2$; 4, pod $\times 1/2$. (MacKee 38981).

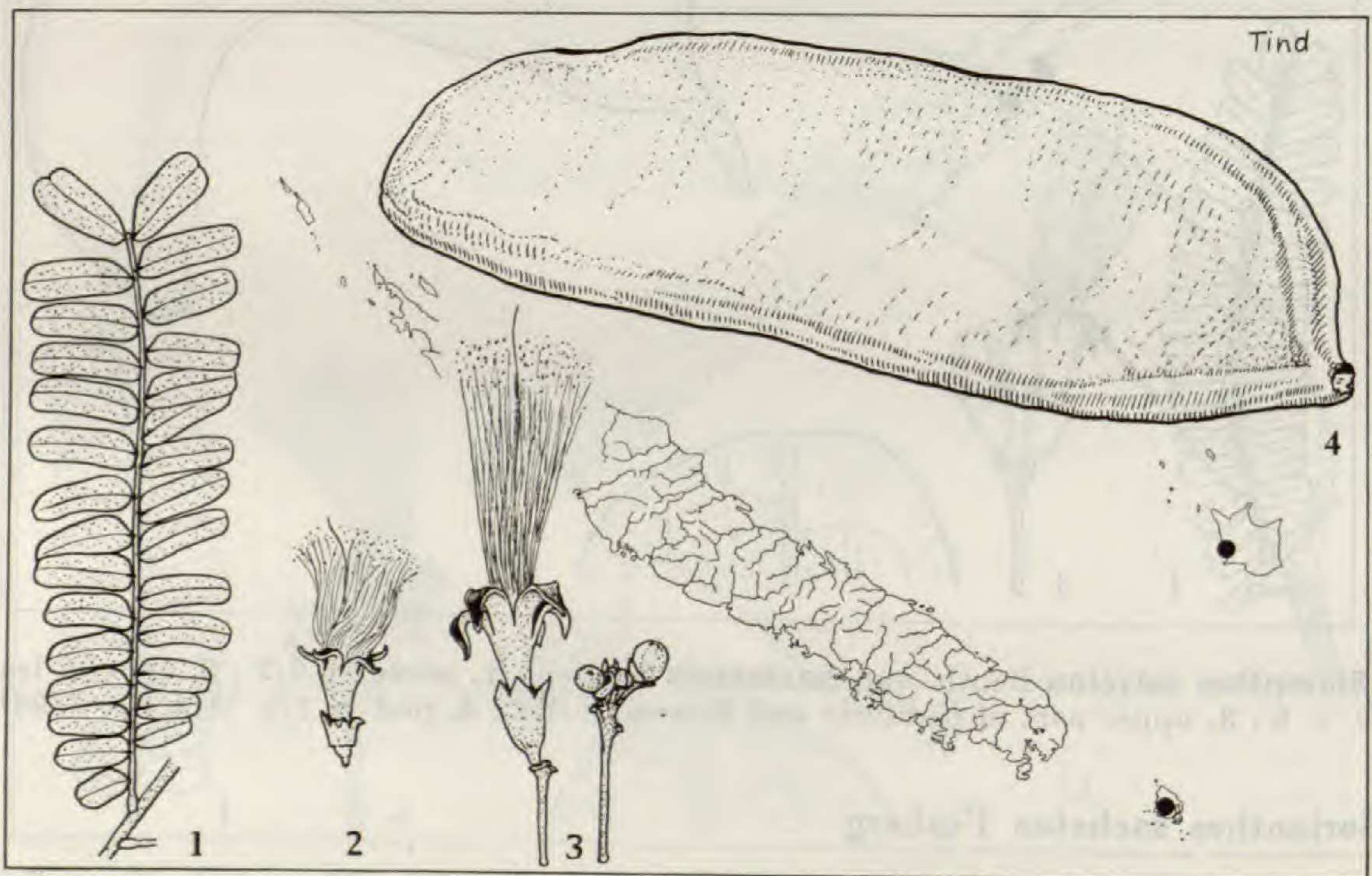
14. *Serianthes sachetae* Fosberg

Reinwardtia 5 : 310 (1960), p.p., excl. Däniker 1233 ; NIELSEN, Flore de la Nouvelle-Calédonie et dépendances 12 : 56 (1983).

TYPE : Balansa 322, New Caledonia, Baie de Prony (holo-, P ; iso-, A, G).



Pl. 16. — *Serianthes sachetae* Fosb. : 1, pinna $\times 1/2$; 2, apex of leaflet, lower surface $\times 6$; 3, detail of lower surface of leaflet showing indumentum and papillose epiderm $\times 25$; 4, part of inflorescence and flowers $\times 1/2$; 5, flower from large-flowered specimen $\times 1/2$; 6, pod $\times 1/2$. (1-3, 6, *Balansa 322* ; 4, *MacKee 2310* ; 5, *MacKee 28726*).



Pl. 17. — *Serianthes sachetae* Fosb., aberrant specimens : 1, pinna $\times 1/2$ (*MacKee 37732*, Ile des Pins) ; 2, flower $\times 1/2$ (*Germain s. n.*, Ile des Pins) ; 3, flower $\times 1/2$ (*Däniker 2801*, Maré) ; 4, pod $\times 1/2$ (*Däniker 2867*, Maré).

DISTRIBUTION : New Caledonia, Ile des Pins, Maré. — Pl. 15, 16.

ECOLOGY : Littoral forest, gallery forest, mesophilous and hygrophilous forest, rarely in scrub; recorded from serpentine soil; alt. up to 400 m.

15. **Serianthes lifouensis** (Fosberg) Nielsen

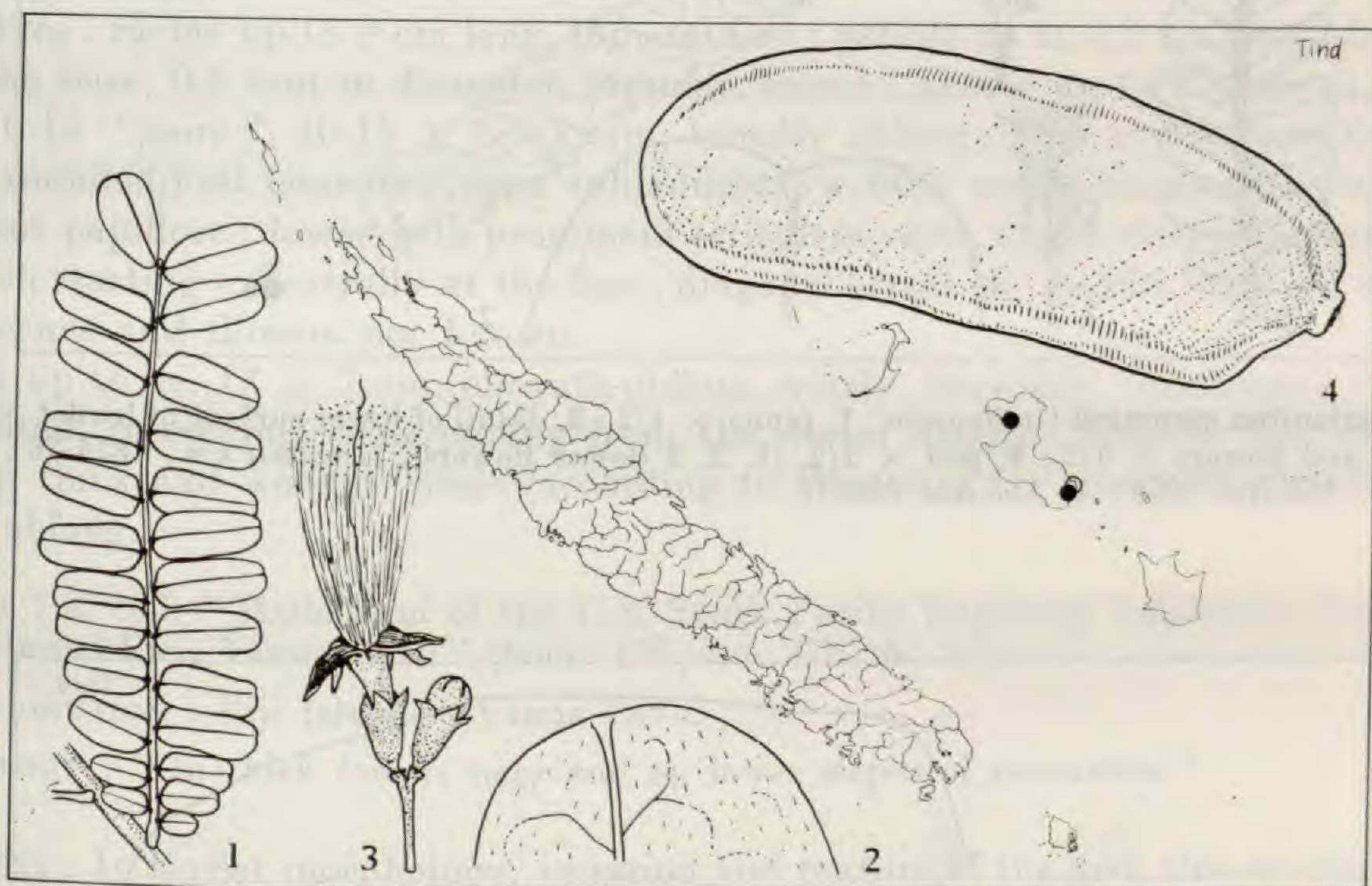
Flore de la Nouvelle-Calédonie et dépendances 12 : 60 (1983).

— *Serianthes melanesica* FOSB. var. *lifouensis* FOSB., Reinwardtia 5 : 314 (1960).

TYPE : *Balansa 2458*, Lifou (holo-, P).

DISTRIBUTION : Endemic to Ile Lifou. — Pl. 18.

ECOLOGY : Forest and coastal scrub on limestone; alt. up to 150 m.



Pl. 18. — **Serianthes lifouensis** (Fosb.) Nielsen : 1, pinna $\times 1/2$; 2, detail of lower surface of leaflet $\times 6$; 3, peduncle and flowers $\times 1/2$; 4, pod $\times 1/2$. (1-3, *MacKee 28266* ; 4, *Balansa 2458*).

16. **Serianthes germainii** Guillaumin

Notul. Syt. (Paris) 2 : 375 (1913) ; FOSB., Reinwardtia 5 : 306 (1960) ; NIELSEN, Fl. de la Nouvelle-Calédonie et dépendances 12 : 64 (1983).

TYPE : *Germain s.n.*, s. loc. (holo-, P).

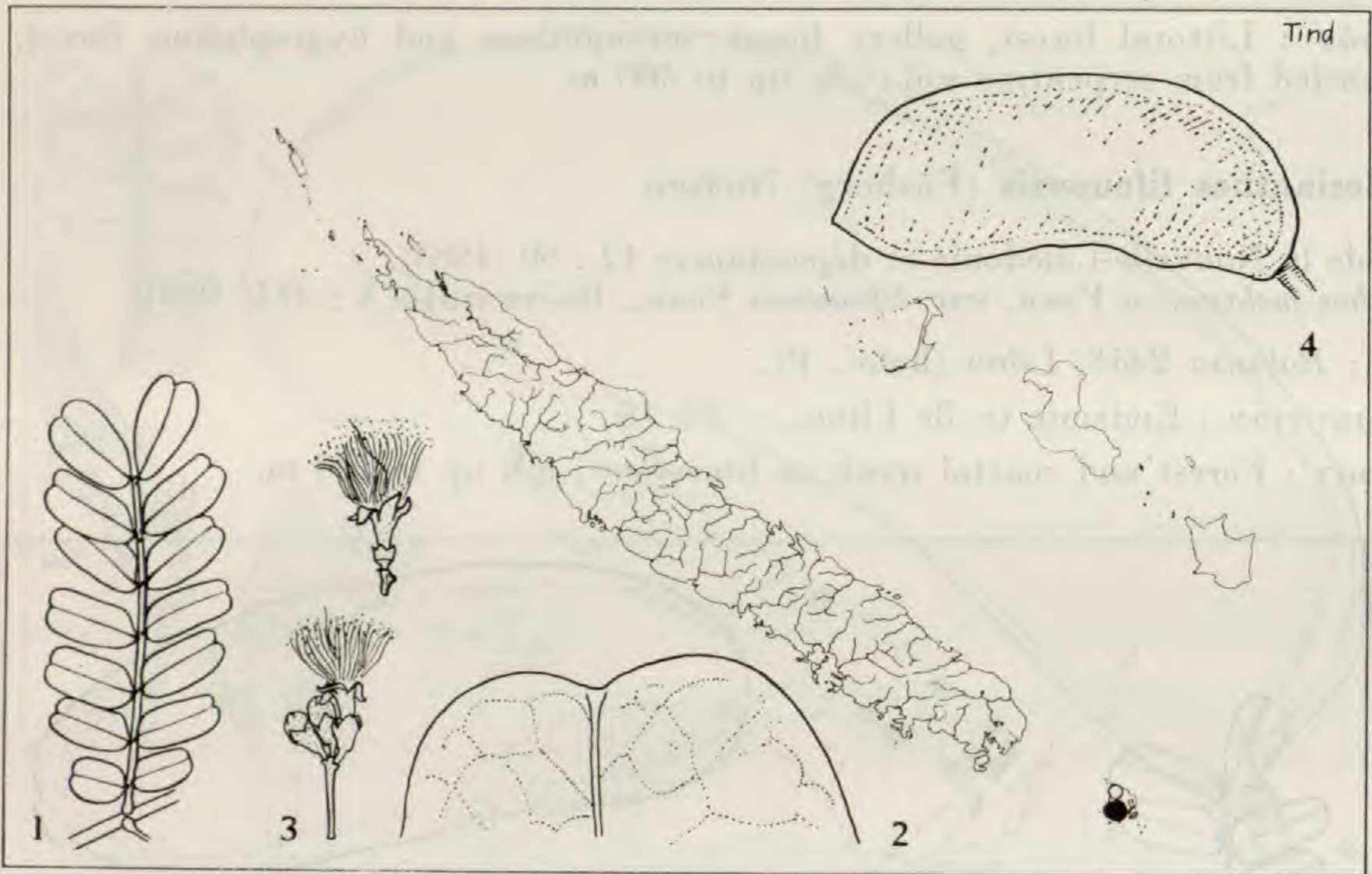
DISTRIBUTION : Endemic to Ile des Pins. — Pl. 19.

ECOLOGY : Scrub on serpentine and peridotite soil on upper slopes of Pic Meunier and Pic N'ga; alt. 100-260 m.

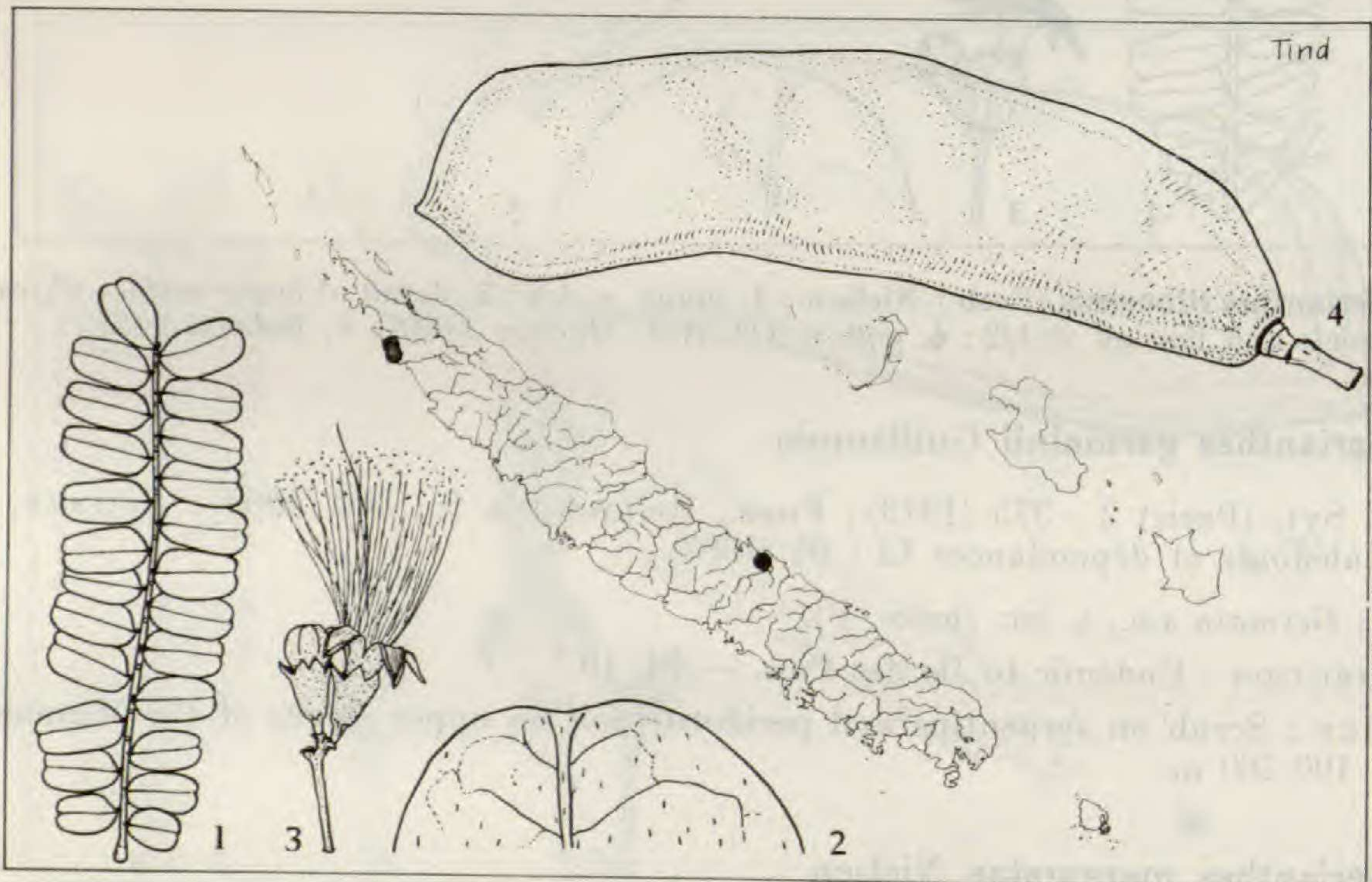
17. **Serianthes margaretae** Nielsen

Flore de la Nouvelle-Calédonie et dépendances 12 : 65 (1983).

TYPE : *MacKee 33001*, New Caledonia, Canala, base sud du Pic des Morts (holo-, P).



Pl. 19. — *Serianthes germainii* Guillaumin : 1, pinna $\times 1/2$; 2, detail of lower surface of leaflet $\times 6$; 3, peduncle and flowers $\times 1/2$; 4, pod $\times 1/2$. (1, 2, 3 (lower flowers), *Germain s.n.*, 1874-76 ; 3 (upper flower), *MacKee 5036* ; 4, *MacKee 15551*).



Pl. 20. — *Serianthes magaretae* Nielsen ; 1, pinna $\times 1/2$; 2, detail of lower surface of leaflet $\times 6$; 3, peduncle and flowers $\times 1/2$; 4, pod $\times 1/2$. (*MacKee 14968*).

DISTRIBUTION : New Caledonia. — Pl. 20.

ECOLOGY : Scrub and coastal scrub on rocky and alluvial serpentine soil at low altitudes ; alt. 5-20 m.

INSUFFICIENTLY KNOWN SPECIES

***Serianthes vitiensis* A. Gray**

U.S. Expl. Exped., Bot. Phanerog. 1 : 485 (1854) ; BENTH., Trans. Linn. Soc. London 30 : 599 (1875) ; FOSB., Reinwardtia 5 : 306 (1960).

Leaves : rachis up to 9 cm long, tomentulose ; petiole up to 4.5 cm long, gland 2.5 cm above the base, 0.5 mm in diameter, circular, raised ; pinnae up to 8 pairs, 4.3-6.5 cm ; leaflets 6-13 "pairs", 10-15 × 5.5-7 mm, broadly oblong ; base asymmetrically truncate to half rounded/half cuneate ; apex subtruncate, a little emarginate ; both surfaces glabrous, not papillose ; lower with prominent reticulate veins, upper with prominulous veins ; main vein starting excentrally at the base, diagonal across the middle third of the leaflet. Inflorescence and flowers not known.

Pod up to ca. 13 × 7 cm, obovate-oblong, woody, brownish, tomentose ; valves with ca. 6 raised, branching veins issuing from the dorsal margin ; epicarp thin and flaking, endocarp thick and woody ; seeds (according to FOSBERG, *l.c.*) about 16 mm long, transversely oblong.

TYPE : s. coll. "Herbarium of the U.S. South Pacific Exploring Expedition Fejee Islands, at Sandalwood Bay, Vanua Levu" (holo-, US ; iso-, GH, K, NY).

DISTRIBUTION : Fiji Islands : Vanua Levu.

ECOLOGY : "In thick forests near and on lower slopes of mountains".

NOTES : In leaflet morphology, venation and texture of the pod, this species is closely resembling *S. hooglandii* from New Guinea. But the U.S. Exploring expedition never landed on New Guinea or neighbouring islands, where *S. kanehirae*, *S. hooglandii* and *S. robinsonii* are found (BRYAN, Proc. U. S. Naval Inst. 65 : 1458, 1938). Greenwood 617 (K) collected in the Lambasa Mts. on Vanua Levu belongs to this species. Unfortunately it is sterile. GREENWOOD made the following field notes "in thick forests near and on low slopes of mountains. Seen up to 50 ft. high ca. 2 ft. thick no flowers or fruits".

Additional material could show if this species really belongs in section *Serianthes* as is suggested by the pods and the leaves.

***Serianthes* sp. in obs. No. 1**

Based on *M. S. Johnson 54*, New Hebrides, Erromanga Island, Mt. William ; alt. 200-600 m (K).

A large tree up to ca. 0.9 m d.b.h. ; bark smooth. Leaves : rachis up to ca. 40 cm long, faintly pubescent in the proximal part, densely pubescent to tomentulose in the distal ; petiole ca. 8-10 cm long, glands 1.5 and 8.5 cm above the base, 1-1.2 mm in dia-

meter, circular, raised, slightly rimmed; pinnae up to 17 "pairs", mostly alternate, to 7.5 cm long; leaflets up to 15 "pairs" per pinna, 10-13 × 4.5 mm, oblique, oblong; base asymmetrically truncate; apex sharply acute; both surfaces glabrous; main vein close to the back margin at the base, diagonal across the blade in the broad leaflets, lateral veins prominent, reticulate. Inflorescence, flowers and pods unknown.

This is a strikingly new species, which is still inadequately collected. Can easily be distinguished by the sharply acute leaflets. The venation of the leaflets shows affinity to sect. *Serianthes*. The species has only been collected once in Erromanga by M.S. JOHNSON, who described the habitat as: "closed high forest on volcanic soil on mountain slopes-plateau. Large tree up to 90 cm d.b.h., smooth bark, occasional but widespread 0.90 stems/ha. ≥ 60 cm d.b.h. recorded".

Serianthes sp. in obs. No. 2

S. melanesica var. **yunckeri** FOSBERG, Reinwardtia 5 : 313 (1960), *p.p.*, *quoad typus Yuncker 16141*.

— *S. myriadenia* auct. : YUNCKER, Bull. Bish. Mus. 220 : 128 (1959).

Tree about 6 m high, trunk about 0.25 m in diameter. Leaves : rachis 14 cm, petiole 3-4 cm, gland 0.6-0.7 cm above the base, 1 mm in diameter, circular, sunk into the rachis, only slightly concave in the central part; leaflets 6-14 × 3-5 mm, oblong, slightly curved; upper surface shortly sericeous, lower sericeous.

Flowers : calyx 8-10 mm, narrowly campanulate, tomentose; corolla 20-24 mm, funnel-shaped, tomentose in the distal part, glabrous in the proximal part of the included portion; stamens deep red, up to 60 mm long, tube about as long as the corolla-tube.

Pod and seeds not seen.

TYPE : *Yuncker 16141*, Tonga : Vava'u (holo-, BISH; iso-, GH).

DISTRIBUTION : Tonga : Vava'u.

ECOLOGY : Alt. ca. 130 m.

VERNACULAR NAME : "Mohehohe" (Tonga).

NOTES : As long as the pod is unknown the status of this entity remains unclear. The petiolar gland is similar to that found in var. *melanesica*. The lower surface of leaflets is sericeous, opposed to the puberulous to pilose ones found in var. *melanesica*. In other characters : slightly curved leaflets and narrowly campanulate calyx it is approaching *S. myriadenia*. The lower leaflet surfaces of the type are papillose.

Serianthes sp. in obs. No. 3

— *S. melanesica* var. *samoensis* FOSB., Reinwardtia 5 : 314 (1960); Type : *Whitmee 177*, Samoa (holo-, K; iso-, MEL).

Leaves : rachis faintly tomentose, 17.5-21 cm; petiole 5.5-6.5 cm, gland 1.2-1.7 cm above the base, 1.5-2 mm in diameter, circular, flat, raised; pinnae 6 "pairs", opposite to alternate.

Inflorescence : panicle to 16 cm long (excl. flowers) ; peduncles to 5 cm long bearing triads of subpedicellate flowers, 2 to 3 flowers occasionally situated lower down the peduncle. Flowers : calyx 11 mm, campanulate, tomentose ; teeth 1.5-2 mm, triangular, acute ; corolla 30 mm, funnel-shaped, tomentose, lobes ca. 10-12 mm, oblong, acute, tube exceeding the calyx ; stamens about 60 mm, the tube about as long as the corolla tube.

Pod 15×3.6 cm, oblong, curved, with sinuate and strongly raised margins, tardily dehiscent, valves woody, tomentose with a dense, obscure, transverse parallel pattern of venation ; epicarp thinly woody, endocarp very rigidly parchmentlike. Seeds darkbrown $14-17 \times 11-12$ mm, flattened, ca. 3 mm thick, obovate to obovate-elliptic ; areole $9-10 \times 6-7$ mm, obovate-elliptic, pleurogram open.

DISTRIBUTION : Samoa sens. lat. (only known from the type).

NOTES : A very distinct entity with tardily dehiscent pods and wide and flattened seeds. Until the leaves are known I desist from elevating it to the rank of species. It might prove to be close to *S. rurutensis*.

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A typed list of specimens studied is obtainable at the address of the first author.

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ERRATA

Part 1, table 1, p. 306 :

- *Archidendropsis* has dehiscent pods, not ornithochorous ones.
- *Archidendropsis streptocarpa* has seedling belonging to type 2. The first author misinterpreted the early seedling-stages. Recently a fresh seed-sample of this species was germinated (*MacKee 41759*), which had a twice-pinnate first foliar leaf. This genus has thus both seedling types.